The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Trade with the Dominions

THIS week's issue of THE CHEMICAL AGE is the fourth autumn number we have published, and special arrangements have been made for its circulation in the leading export markets. It is unnecessary to reiterate the importance of developing our export trade to the full, and it goes without saying that a bid must be made in the first place for those customers whose demands are likely to be of a sound and permanent nature rather than expending too much effort on markets in which the demand may be only a passing one. We have from time to time drawn attention to the fact that our own Dominions offer, in the first instance, the most promising field, for before the war the more important of them purchased nearly 50 per cent. of their manufactured goods from this country. Only a year or two ago the home manufacturer found himself in the fortunate but abnormal position of basking in the sunshine of exceptional trade activity; and, finding his books filled with home trade orders, he very naturally felt little inclination to look round for other markets. The post-war period of home trade activity has come to an end, and although there is every satisfaction in knowing that the worst of the depression has now been left well behind, there is none too much hope of an immediate revival of the pre-war demand for British manufactured goods.

It has been said that the crisis through which British trade has been passing cannot be permanently solved unless there is an intensive and progressive development of inter-Imperial trade. The development of the resources of the Dominions of the Empire is the most practical solution of our present problems, not only because the unlimited resources of the Empire are waiting for development, but because, in proportion as these resources are developed, there must grow up in the colonies a vast and ever-increasing demand for manufactured goods from this country.

The majority of our readers will be aware that the spring of next year will mark the opening of the British Empire Exhibition, an enterprise which, under the patronage of the Prince of Wales, has been planned to foster and develop the trade of the Empire. In this connection it will be an interesting and valuable piece of news for our readers to learn that the Federation of British Industries has obtained the co-operation of the different Governments of the Empire in the responsible task of compiling a comprehensive survey not only of the whole of the resources of the Empire, but of the requirements, both present and prospective, in relation to production. The survey is, we understand, to be arranged as far as possible by industries, to each of which a separate volume will be given, one of which volumes will deal exhaustively with chemicals, dyes, and fertilisers. From the preliminary arrangements as to the scope of the survey which we have been permitted to see, we have no hesitation in saying that it must form an indispensable work of reference to the business man and manufacturer, and that it will present with the most complete authority all those facts in connection with overseas requirements which at present are either unobtainable or scattered throughout such a mass of official literature as to render them almost useless. An enterprising movement of the kind which the Federation of British Industries has decided upon must play an important part in starting the tide of trade to flow, and when it commences once again to flow with full vigour, the new reference work should prove of no mean assistance in preparing this country to take advantage of the opportunity. When to our reputation as producers of high grade materials we add the quality of really good publicity, there will be every justification for our view that British industry—and particularly the chemical industry—has a great and enviable future.

Canned Foods

THE canned food industry has attained such enormous proportions during recent years, and, without regard to season, supplies meats, fruits and vegetables in such a satisfactory and convenient form that any factor tending to raise doubts as to the wholesomeness of these foods is to be regretted. A correspondent, who bears out what we had to say in these columns last week, has written suggesting that since the termination of the War there have been on the market canned

foods which have all the external appearances of having been stored for a very considerable time, or for a shorter time, in an unsuitable place. Our correspondent mentions that under present conditions there is nothing to prevent the containers from being externally cleaned, and new labels substituted for old faded ones, rendering it impossible for the buyer to distinguish them from recently packed foods. We cannot say that we ourselves know of any instances of the kind, and we feel that the consumer can safeguard himself by purchasing the products of the recognised firms only, but it is as well to bear in mind the risks which might result from a practice such as our correspondent suggests. The dangers of old or improperly canned foods are twofold; namely, metallic contamination of the contents, and bacterial decomposition owing to air access. By far the larger portion of canned foods of all kinds shows only the slightest traces of tin, while, owing to the great improvements which have taken place in recent years in the manufacture of the containers, contamination with lead from solder in the tins has practically ceased. There are, however, certain foods packed in tins which have a pronounced action on the tin lining, and this is particularly the case with meats and meat-essences, and with some vegetables and fruits. Given a good container with a substantial inner lining of tin, even these foods will show only small and negligible amounts of tin after a reasonable period; but if the food is kept too long, or if the tin lining is defective, allowing early de-tinning of some small part of the coating, with subsequent rapid solvent action owing to electrolytic processes set up inside the can, then a considerable amount of tin may in certain instances go into solution and contaminate the food. A recent instance illustrates the danger of such occurrences. Samples of canned tomatoes examined by a public analyst were found to contain tin to the extent of slightly over 3 and 5 grains per pound in the two worst instances. Externally the containers had all the appearance of having been packed and stored for a long time, and it is well known that tomatoes are very liable to act vigorously on tin. Evidence given in the case proved that the more heavily contaminated food in one container showed over 8 grains of metallic tin in the whole contents, and that a person might take over two grains of tin into the system from such food at a meal.

It has recently been stated by Dr. W. G. Savage, an authority on the subject, that the danger of tin poisoning from canned foods has been much exaggerated, and that there have not been to his knowledge any recent cases of the kind. While it may be remarked that it is unlikely that a chemical cause of poisoning would affect so large a number of people as would bacterial contamination of food, where few escape infection, it certainly seems probable that a part of the metal will in some cases be in an insoluble form and innocuous in the body. But quantities as large as those found in the case referred to are somewhat unusual, and it cannot be contended that they are of no account. The solvent action of the vegetable juices on the tin lining of the can must be progressive, and at any given moment it is probable that much of the tin will be in a soluble form. It is permissible to sympathise with the retail vendors of these foods, as without analytical examination the state of the food cannot be known. It is, therefore, eminently desirable that there should be some system whereby the age of these foods may be ascertained. Certain canned goods will generally be in good condition in one year or so from canning; others might by that time have passed the safe limit owing to the acid nature of their contents, or to the presence of salt, which is known to exert a corrosive action on tin or to accelerate such action. It should be possible for the Ministry of Health to come to some arrangement with American and other canners of these foods, whereby the can could be dated and the dangers mentioned minimised. If this were done, there is no doubt that canned foods would retain their place in the public favour, for to many they bring a welcome variety of diet which is of great value. Glass-packed foods may be preferred by some purchasers, but owing to their liability to fracture in the sterilisation process glass containers are not so suitable as sound tins which can be heated to the proper temperature without harm, thus giving the consumer a better safeguard against bacterial contamination. If foods are packed in well-made tins, properly sterilised and rendered airtight, and if we could have the date of packing stamped on the container so that the consumer might assure himself that the food is not stale by reason of undue age, there would be few articles of diet less open to suspicion than the canned foods with which to-day almost every household is so familiar.

The Poison Gas Problem

An American chemist, Colonel R. F. Bacon, is reported to have invented a new war gas which he has described before the American Chemical Society. It is named "Soporite," and is intended to be used in enemy cities, by distribution from aeroplanes, the effect being that the population is rendered unconscious for some hours—sufficiently long to enable the aggressor to seize the reins of government before the people know anything about it. This is one of many such gases produced or invented since the war, some of them much less pleasant—that of Colonel J. F. C. Fuller, D.S.O., for example, which is intended to render its victims *hors de combat* for six months or so. There is presumably some excuse for soldiers of a scientific turn of mind inventing new war weapons of an overwhelming nature. The use of such gases has, of course, been defended in these columns by no less a protagonist than Sir William Pope, on the ground that the fatalities are lower than with any other known weapon. The real points, however, which cause a feeling of revulsion for this kind of thing are that the war is carried on against the unprotected and defenceless citizen, and also that, if pleasant soporific gases are allowable, nothing will prevent an unscrupulous foe using virulently poisonous ones, and so avoiding the difficulties which would arise when the hostile populace recovered. Actually it is probable that only a powerful public opinion among the principal nations could have any control over this matter. There is at the moment little sign of this, although the machinery for its

expression is now available. Meanwhile an interesting but possibly impracticable suggestion has been put forward by a correspondent in a scientific contemporary, that scientists throughout the world should take the matter into their own hands by refusing to further or make public in any way any invention that might be turned to destructive use. The scientist has actually added immensely to the amenities of life, and many of our greatest workers, such as Lord Kelvin, for example, have definitely had that aim in view. If the military scientist is allowed a free hand it seems highly probable that after the next war, if it is much worse than the last, an ignorant democracy will blame the scientist for all the new horrors which will have been added to war, not without some reason. The result might well be the active discouragement of all research and scientific work, and a relapse into the conditions of the Middle Ages. This would be the suicide of science, and though it does not seem imminent at the moment, it is undoubtedly a possibility, and one which has not escaped the "prophetic" writers of the day. In forming a balanced judgment on this matter, it must not be forgotten that civilisation after civilisation in the world's history has been destroyed by war.

Dyes as Temperature Indicators

In the August number of our contemporary, *Industrial and Engineering Chemistry*, Mr. Paul A. Kober makes an interesting and highly practical suggestion, which we do not recollect having met with before, for the employment of dyes as temperature indicators. The writer points out that in many industries heating and temperature regulation constitute one of the most important features of a process, while in some cases the methods employed do not indicate the actual temperature conditions sought. For this reason a method was recently developed which is based on the decomposition of an organic dye, and it has shown itself in practice to be most reliable and efficient. In order that a dye may act as a heat indicator it is necessary that when heated it will break down readily into gases and leave no appreciable residue behind. Most dyes do not possess this characteristic. Usually they decompose to some extent into other solid substances and then disappear only after a high temperature has been applied, thus carbonising the dye with subsequent oxidation. There are, however, a considerable number of dyes which act as very good indicators when subjected to heat. These break down easily with the complete disappearance of the colour. Dyes which change on heating through many shades will obviously not act as good indicators. Colours such as blue, green and red, when applied to various substances, act as the best indicators, while colours like yellow and brown show insufficient colour changes. Dyes that break down readily on heating are not confined to any particular chemical group. Most of those found, however, are identified with the triphenylmethane colouring matters.

Mr. Kober refers in detail to several important factors which influence the use of dyes for this purpose; he discusses the different methods of application, and the manner in which the standard solutions should be made up. It is particularly interesting to note that a double indication may also be obtained. For instance, in order to indicate in heating processes whether the heat applied has passed a maximum as well as a minimum temperature limit, two suitable indicators would ordinarily be necessary. To avoid the application of two different dyes an indicator was developed showing both the minimum and maximum temperature limits. It was found that two dyes—for example, a red and blue forming a violet—can be dissolved in absolute alcohol without combining chemically. When such a solution with the right proportions of the components is applied to the part to be heated, the lower temperature dye will disappear at its own particular temperature and time interval, this changing sharply the violet mixture to either a red or blue, depending on which is the lower component dye. In other words, the higher component dye is left on the material. If the time interval and temperature are then increased to a point corresponding to the higher component dye, it will also disappear. This "double indicator" in a single solution, then, will enable one to tell by inspection whether the heat applied was below, within the limits set, or above the maximum limit.

Points from Our News Pages

An appreciation of the work of Sir George Beilby, the late Director of Fuel Research, appears this week (p. 332).

An article is published on "The Manufacture of British Chemical Porcelain," by Dr. G. N. White (p. 334).

Mr. Wilfred Wyld, who has recently returned from India, contributes some interesting notes on industrial and other conditions (p. 336).

A special series of notes is given on "Chemical Trade Openings Abroad" (p. 338).

An abstract appears of the official report on the work of the Government chemist (p. 341).

A special account of the new Hele-Shaw Stream-Line Filter is published (p. 342).

According to our London Market Report there is reason to hope that the improvement shown recently will be progressive. (p. 351).

Business in the Scottish chemical market remains quiet, according to our report (p. 354).

Books Received

Relativity. By J. Rice. London: Longmans, Green and Co. Pp. 397. 18s.

Recent Developments in Atomic Theory. By Leo Graetz. London: Methuen and Co., Ltd. Pp. 174. 9s.

A First Course in Machine Construction and Drawing. By T. M. Naylor and W. Tattersall. London: H. F. and G. Witherby. Pp. 156. 6s.

The Calendar

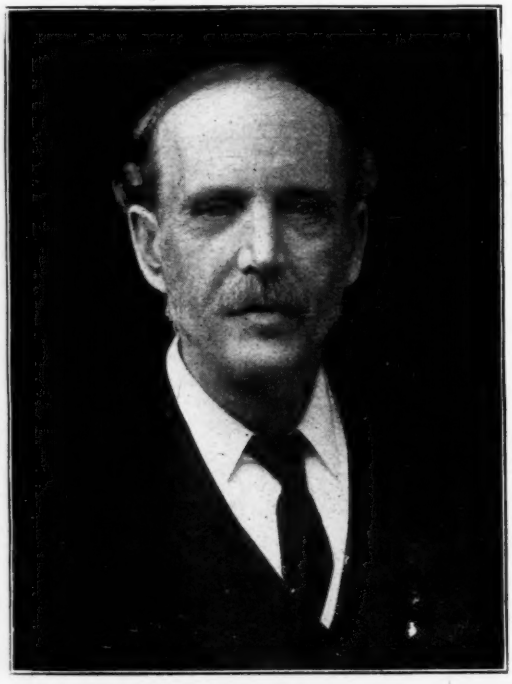
Oct.		
1	Society of Engineers: "Improved Method for Mass Production of Tank Glass Bottles, Jars, etc.," by Alec Ferguson. 5.30 p.m.	Burlington House, Piccadilly, London
1	Institution of the Rubber Industry. 8 p.m.	Engineers' Club, Coventry St., W.1.
3	Society of Public Analysts. 8 p.m.	Burlington House, Piccadilly, London.
4	Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, London.
5	Society of Chemical Industry (Manchester Section): "Recent Progress in Chemistry," by Dr. H. Levinstein. 7 p.m.	Textile Institute, 16, St. Mary's Parsonage, Manchester.
6	West Yorkshire Metallurgical Society: Annual Meeting.	Huddersfield.

The Late Director of Fuel Research

Sir George Beilby, LL.D., F.R.S.

It will be recalled that some few weeks ago Sir George Beilby resigned his position as Director of Fuel Research, and was succeeded by Dr. C. H. Lander. We felt at the time that the distinguished services which the late Director rendered, not only to the chemical industry, but in the interests of the country as a whole, could not be permitted to pass unnoticed in our columns. Those who have personal knowledge of Sir George will readily understand that his characteristic modesty and dislike of publicity are considerable obstacles in the way of any attempt to do justice to his work. We are now, however, able to give a short appreciation of Sir George, which has been specially contributed by one who has had every opportunity for studying his unique qualifications and the breadth of his knowledge and experience.

THE whole tendency of modern industry is towards bulk production, and the substitution of mechanical for human operations. This tendency has demanded an ever-increasing consumption of mechanical or electrical energy which in this country has meant an increasing demand for fuel, chiefly coal. British industry holds its present position largely because of the readiness with which it can obtain coal—its very life-blood. Our supplies of home-produced fuel are, however, by no means inexhaustible, and the utilisation of such as we have in the most economic manner possible, with the least prejudice to the health and happiness of the community, is a matter of the highest national importance. In recent times the urgent necessity for investigating the possibilities in connection with home supplies of fuel oil for the Navy and Mercantile Marine was emphasised by Lord Fisher's Commission in 1912–13, while Lord Haldane's Coal Conservation Committee in 1917 drew attention to the need for a survey of the national coal resources. That these recommendations have been put into practical effect is due to the unsparing labours of Sir George Beilby, whose retirement from the post of Director of Fuel Research was recently announced.



SIR GEORGE BEILBY.

When Sir George undertook the duties of that post, the country secured the voluntary services of one who has literally unique qualifications; for he combines the outlook and standing of an eminent scientist with the wide experience of a builder of industries. Of his many contributions to pure science, the most widely known are his studies of the microstructure of solids; a collective account of his researches in this field, extending over many years, was published in 1921 under the title of "The Aggregation and Flow of Solids," and his views have taken an important position in modern metallography. In the industrial world Sir George Beilby is the discoverer of processes which have been introduced with far-reaching effects. It is probably no exaggeration to say that it was the invention of the Beilby and Young retort which saved the Scottish shale oil industry from extinction, enabling it, in the face of a very fine margin between profit and loss, to meet the competition of imported oil. In 1893 the Beilby process for the synthetic production of cyanides was perfected, and, in the hands of the Cassel Cyanide Company, it has fed the mines of the Empire with the cyanides required for gold extraction. The significance of this fact during the war is well indicated by Mr. James W. Gerard in his book, *My Four Years in Germany*:—

"The German Vice-Chancellor Delbruck put an export prohibition on cyanide early in the war, and most pig-headedly and obstinately claimed that cyanide was manufactured nowhere but in Germany. . . . It was a long time before the German manufacturers and I could convince this gentleman that cyanide sufficient to supply all the British mines was manufactured near Glasgow, Scotland."

This brief statement by no means includes all of Sir George Beilby's industrial interests and achievements; for the rest reference can only be made to his almost lifelong study, as a manufacturer and a scientist, of all questions connected with the economic utilisation of fuel.

The Fuel Research Board was established by the Department of Scientific and Industrial Research in 1917, and as chairman of the Board and Director of Fuel Research came Sir George Beilby, ready to give freely of his wide knowledge and experience. Realising, as might have been expected of one of his outlook, that fuel problems cannot be solved by means of laboratory experiments alone, that if "one man's meat is another man's poison," so the meat of the laboratory *may* be the poison of industry, he planned and erected a Research Station offering unique facilities for the prosecution of small and large scale fuel investigations. Briefly, the Fuel Research Station at East Greenwich is so devised that its operations are comparable in degree of accuracy with typical laboratory experiments, and in magnitude with those of an industrial works. For small scale investigations and analytical control work, adequate and well-equipped chemical and physical laboratories are provided. For the technical scale researches, horizontal and vertical coal distillation plants with all necessary appurtenances are available, and are of a size such as would provide for the gas needs of a small town. Plant of various other uses is also furnished. In the design of the large scale plant every attention has been given to latitude of operation, ease and certainty of control, and the quantitative checking of every measurable factor in the work. In this and other respects the plant is remarkable; it affords comprehensive facilities for fuel research which are to be found nowhere else, and the results of the work undertaken at the station can be accepted as directly applicable under industrial conditions.

The erection of H.M. Fuel Research Station, commenced during the war under slow and difficult conditions, occupied a considerable time, but important work has already been completed, and reference to the published results has been made from time to time in the columns of THE CHEMICAL AGE. The programme of the Fuel Research Board is too comprehensive to be recited here, but reference should be made to the survey and classification of the coal seams in the various mining districts of Great Britain which is being steadily organised by the Board, with the co-operation and assistance of the local bodies most intimately concerned. Such functions, undertaken in this manner, are bound to yield most valuable results.

Services in the War

Sir George Beilby has devoted the last seven years almost exclusively to the work of the Fuel Research Board. Having seen the Fuel Research Station firmly established and in active operation, and having made more than a beginning upon the extensive programme of research laid down by the Board, he has now resigned his directorship and the chairmanship of the Board to return to his personal scientific work. It is gratifying to know that, as Honorary Scientific Adviser to the Board, he will still retain his connection with, and interest in, its work.

This country owes a debt of gratitude to Sir George Beilby, not only for the work described above, but also for his services during the war to the Admiralty, the War Office, and the Ministry of Munitions. The value of these can hardly be over-estimated. One of the few permitted to know of them was the late Lord Fisher, who, in characteristically forceful language, described Sir George as "the greatest living chemist, as meek as Moses, and as thorough as Cromwell." If meekness implies detestation of publicity in any and every form, the dictum needs no qualification.

G. BLAIR.

Empire Mining Congress

THE Prince of Wales has consented to become honorary President of the forthcoming Empire Mining and Metallurgical Congress. The Congress will be held at the British Empire Exhibition in London during the first week in June, 1924, and the following institutions are co-operating as conveners:—

The Institution of Mining and Metallurgy, the Institution of Mining Engineers, the Institution of Petroleum Technologists, the Iron and Steel Institute, and the Institute of Metals, representing the scientific and technical interests of the mineral and metal industries, the Mining Association of Great Britain, and the National Federation of Iron and Steel Manufacturers, representing the colliery proprietors and iron and steel manufacturers, respectively, of the British Isles.

This is the first Empire Mining and Metallurgical Congress to be held, and it is anticipated that succeeding sessions will be held in the Dominions under the auspices of an Empire Council of Mining and Metallurgical Engineering Institutions, which, it is hoped, will be constituted as a result of the inaugural congress.

Lord Long of Wraxall has accepted the invitation of the Institution of Mining and Metallurgy to deliver the "Sir Julius Wernher Memorial Lecture" at the opening session of the Congress, and he will take as his subject "Mineral resources and their relation to the prosperity and development of the Empire." The "May Lecture" of the Institute of Metals to be delivered by Dr. F. W. Aston, F.R.S., will also form part of the programme of the Congress. Dr. Aston's subject will be "Atoms and Isotopes."

Four Thousand More Unemployed

THE Ministry of Labour states that the number of persons on September 17 recorded on the live registers of the employment exchanges in Great Britain was 1,227,100. This was 4,034 more than in the preceding week. In addition, the number working systematic short time and drawing benefit for intervals of unemployment was 75,800 on September 17, compared with 75,361 on September 10.

Society of Chemical Industry

Meeting in Connection with the National Gas Exhibition

A JOINT meeting of the Birmingham and Midland Section of the Society of Chemical Industry and the Midland Junior Gas Association was held on Tuesday at the National Gas Exhibition, Birmingham. Papers were read as follows: "Specific Heat of Coal and Relation to its Composition," by Mr. G. Coles (Mining Research Laboratory, University of Birmingham); "A New Gas Fired Combustion Furnace," by Mr. T. J. Hedley (Department of Chemistry, University of Birmingham); and "Improvements in Nett Value Calorimetry," with a description of an automatic device for temperature and pressure correction by Mr. C. H. Beasley. Dr. Maxted presided.

A New Combustion Furnace

Mr. Hedley, in his paper, pointed out that gas combustion furnaces were used in chemistry for the analysis of organic and carbonaceous substances by complete combustion in a suitable glass tube, to form carbon dioxide and water. Nitrogeneous substances were similarly burnt and the nitrogen collected and measured. Existing types of furnaces represented little or no advance in design or efficiency over those in use over half a century, ago and were usually expensive, heavy and cumbrous, easily got out of order and were very wasteful of gas, time, and human energy. The new furnace he described was readily portable by one person, cost considerably less than any other furnace, was economical of gas and could be operated with precision and comfort. The essential features were a multiple flame burner with separate control of each flame, gas being admitted at each end of the burner (which was partitioned at the centre) by a series of jet holes, the number in use being controlled by a screw plunger. The burner was self-regulating as regards air-gas mixture, the air intake by induced draught being governed by the number of jets in use, by this means any type of flame could be obtained for any number of flames, the number of flame orifices open being varied from the front underneath the burner by simple heat screened thumb-screw valves. Adequate provision was made for the protection of the operator, the bench and the bungs of the combustion tube, by suitable hinged and fixed refractory screens. These furnaces were now in daily use in some of the Universities and Colleges at Birmingham, Edinburgh, Leeds, Liverpool, etc., and were made and supplied by W. and J. George, Ltd., Birmingham.

Income Tax Reliefs

To the Editor of THE CHEMICAL AGE.

SIR,—Notices of assessment are this year being received, generally speaking, about the same date as last year. A few days—or even weeks—difference in date of issue is of slight account, however, as in any case tax is not payable until January 1 and July 1, 1924.

The point that is material to the taxpayer is to carefully verify that the assessment amount is correctly stated—Schedule "E" on current year and Schedule "D" on one of the statutory bases. He should also make certain that the appropriate deductions, allowances, and reliefs are given, including earned income relief, personal allowance (single £135, married £225, wife to £45 if earning income), children allowance (first £36 and each additional £27), housekeeper £45, widowed mother £45, dependent relative £25, first £225 of taxable income at 2s. 3d., and life insurance premiums from 2s. 3d. to 4s. 6d. per £.

There are also other less known, but very important, claims for a reduction on account of excessive return or statement made in error or mistake under Schedule "D" expenses wholly and necessarily incurred, superannuation contributions, any necessary relief on taxed income, untaxed interest reduction if investment ceased, wear and tear and obsolescence of plant and machinery, gross Schedule "A" for mills, factories, etc., Dominion income tax suffered, and interest on bank and stockbrokers' loans.

The period within which to appeal against the assessment is 21 days, and any necessary notice should be given before that period expires, although a number of other statutory provisions enable applications for adjustment to be made later, but on specified grounds only.—Yours, etc.,

W. R. FAIRBROTHER.

The Manufacture of English Chemical Porcelain

By G. N. White, D.Sc. (Lond.), F.I.C.

The scientific basis of the work which culminated in the successful commercial production of British Laboratory Porcelain is described by Dr. White, who has devoted some years of work to complex problems in the Ceramic Industries.

BEFORE 1914 it is curious to recollect how little chemical porcelain was the subject of observation, and however it behaved it was not usually subjected to any detailed criticism, When English firms placed low-grade ware on the market as a provisional product during the war, an attitude of critical observation was necessarily assumed by the users, with the result that much more is now known with regard to the limitations of the uses of porcelain than was previously general knowledge. However, the difficulty of obtaining accurate and decisive tests of resistance to fracture has given rise to a number of statements which have been made without due consideration of the whole of the factors involved and are consequently inaccurate and misleading.

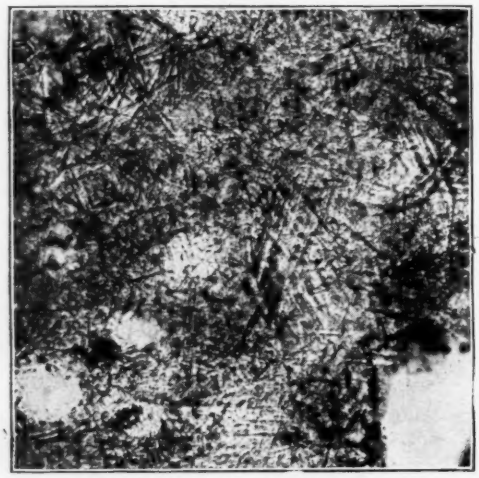


FIG. 1.—PHOTOMICROGRAPH OF THE BODY OF ROYAL WORCESTER LABORATORY PORCELAIN. MAGNIFICATION 500 DIAMS. THE RHOMBIC NEEDLES OF SILLIMANITE IN THE TYPICAL CROSS-HATCHED FORMATION ARE SEEN LYING IN A VITREOUS MATRIX. VACANT SPACES AND BLACK PATCHES IN THE FIGURES ARE RESPECTIVELY HOLES IN THE SECTION AND ADHERING FRAGMENTS OF CARBORUNDUM.

For instance, it may be mentioned that a porcelain of the quality of Royal Berlin ware in the form of basins over 8 cm. in diameter will not stand heating over a bunsen burner if the inner cone of the flame impinges against the base, especially if the basin is placed directly on an iron tripod and not on a pipeclay triangle. Nor will a Berlin crucible over 2.5 cm. in diameter stand similar treatment (in this case, however, with the use of the triangle) if the bunsen is strong and the heating continuous for at least ½ hour. On the other hand, quite a poor quality ware in the form of crucibles will stand the evaporation of a few cubic centimetres of water over a full-blast bunsen burner provided the inner cone is well below the base of the crucible. The explanation of this apparent anomaly is that in the former case the sides of the basin or crucible are hotter by some 500° C. than the bottom, and from this cause a heavy strain is set up along the edge of the base. The fact that the crack thus produced nearly always is a circular one parallel to this edge is evidence of the course of the strain. In the latter case the evaporation of the water prevents any part of the crucible becoming very much hotter than another, and the only test of quality is the impact of drops of water at 100° C. against the sides of the crucible at some 200° C., which is a treatment that a porcelain of even moderate quality will stand. At first sight, however, it would appear that the first treatment was more drastic than the second. If care be taken to heat a crucible up uniformly, it is surprising to what extent it will withstand rapid temperature changes. Thus, to fracture a high-grade porcelain crucible heated to a given temperature all over by plunging it suddenly and completely into cold water, it is necessary to heat it to 320° to 350° C. If, however, the heating is not uniform, or the immersion is slow so that one part of the crucible cools at a different rate from the other, fracture will occur with the use of a considerably lower temperature.

The Problem

Since the manufacture of porcelain involves the reactions of the complex silicates it is usually regarded by chemists as incapable of receiving direct scientific treatment, and until the technical chemist has new methods of research at his command with which to tackle the difficulties now obstructing advancement this opinion is undoubtedly justified. Nevertheless the pottery industries possess problems in urgent need of solution, and these at the present time have to be met by what methods the ceramic chemist can lay his hands upon. The production of chemical porcelain which had to be met with this inadequate equipment, consisted of the invention of a variety of hard porcelain which will carry a hard insoluble glaze, will show a high resistance to fracture on sudden temperature change and at the same time be perfectly vitrified and impermeable to gases below 1,300° C. Before passing to the description of the manner in which the problem has received solution, it is advisable to make a few observations of a fundamental character which will give chemical porcelain its place in the ceramic industry.

General Ceramic Procedure

The basis of all pottery and porcelain is the substance china clay, which is a complex substance, and although its empirical formula is known, it probably consists even in its purest state of a mixture of polymers or closely related substances, all analysing with the same result, and in all probability accounting for the co-existence in clay of crystalline, amorphous and colloidal fractions.

Here no more need be noted than the fact that china clay is a relatively unstable substance as it decomposes about 600° C.

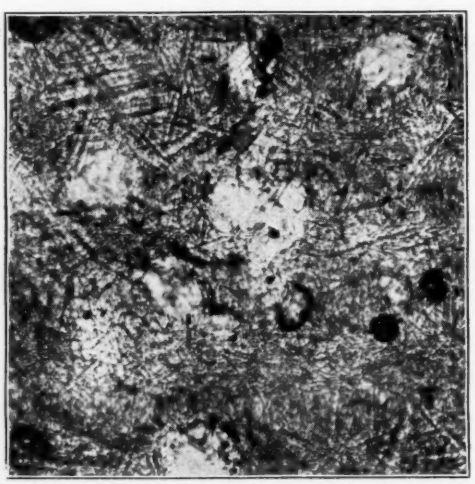


FIG. 2.—SAME AS FIG. 1.

to become, according to Mellor and Holdcroft, a mixture of alumina and silica, each of which probably polymerises at higher temperatures. Theoretically, if one could obtain a simple molecular mixture of these two substances, the amount of work required to be done to bring them into molecular contact as a preliminary to the interaction would be a minimum. In practice, however, it is impossible even to

approach this state of uniformity of composition, with the result that to bring about reaction between the products of decomposition of clay, viz., alumina and silica, the large amount of work as is involved by the raising of the mixture to 1,650° C. has to be performed upon the clay. Otherwise the performance of less work gives as a result a porous product, which, as previously stated, is useless for scientific purposes. In order, then, to obtain a vitrified body, it is necessary to add to clay a reagent which will do part of the work of bringing the clay decomposition products into contact by solution or interaction before or after polymerisation. Such reagents

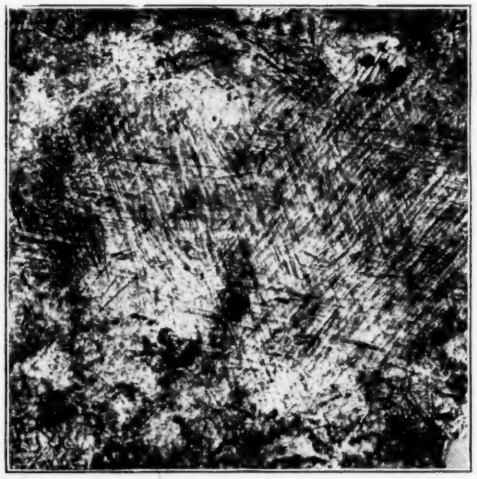


FIG. 3.—SAME AS FIG. 1.

are called fluxes, and although they play a greater part than physical solution we may regard them for simplicity as solvents.

Generally speaking, the solvents we may add to clay are either a mixture of silica and felspar in major or minor proportion or calcium phosphate in the form of calcined bone. In the latter case the product is English bone china, the basis of the English china trade, which does not concern us us here; and in the former case, according to the proportion of felspar added, we obtain either soft or hard porcelain. Chemical porcelain is a type of hard porcelain which contains the minimum of felspathic addition and is therefore the most refractory of all porcelain bodies.

Chemical Porcelain

The reason why chemical porcelain must thus necessarily be low in fluxes is known with a fair amount of certainty, but it would lead the subject into too technical a field to be convenient for our present purpose. Let it suffice to say that in the process of burning the hard porcelain body a chain of reactions occur which culminate in the separation from the amorphous matrix of crystalline aluminium silicate identical with the naturally occurring fibrolite or sillimanite. The ideal to be attained as closely as possible is for the whole of the alumina present in the mixture to separate out ultimately in this crystalline form, for if the efficiency of this crystalline conversion is low, regions of strain persist in the neighbourhood of where the crystal formation has started and the coalescence of these strain regions under an external stress leads to fracture.

It is contrary to no physical law that the acts of crystallisation and fracture should be related; and for amorphous matter in general to be stable towards fracturing forces, it must be as widely displaced as possible from the conditions for transition into the solid state, otherwise the molecules of one or more of its constituents will be more or less under tension and show a liability under external provocation to move into a crystalline arrangement. Therefore a given body, to become stable towards fracturing forces, must be treated in such a way that it approaches either the perfect fluid as in the case of glass, or the perfect solid as in the case of porcelain. This transformation in neither case can be ideal, but it is the work of the ceramist to devise conditions which allow of the closest approach to the limiting ideal states. Without going into technicalities, therefore, it can be said that in the manufacture of hard chemical porcelain the clay mixture is of such a kind and is given such a burning treatment that, after it has become impermeable but amorphous, it is caused, as it were, to pass the border and enter the solid area to the farthest extent.

Types of Fracture

In addition to the formation of sillimanite, the stability of some kinds of porcelain bodies is dependent also on another crystalline conversion, namely, the transition of quartz into tridymite, the low-gravity form of silica. This conversion takes place during the later stages of the firing at a rate affected to a considerable extent by the composition of the body being accelerated by the presence of various substances in catalytic quantities. The importance of this reaction and its effect on the quality of the ware lies in the fact that it involves an expansion of the pieces; and if the conversion is incomplete before the ware is dipped in the powdered glaze, and the completion occurs against the viscosity and surface tension of the melted glaze during the second fire, the pieces are unstable, tending at a greater or lesser rate to neutralise the tension existing between the body and the glaze after removal from the kiln. Specimens of porcelain showing this peculiar result usually fall to pieces or crumble in the hand, and yet, if the tridymite conversion is complete before glazing, the ware is of the finest quality in its resistance to fracture.

There is evidence available that there are two kinds of fractures—mechanical fractures and heat fractures. It sounds a paradox, yet is nevertheless a fact, that as a general rule the more brittle a porcelain is the better it withstands rapid temperature changes, tough porcelains being unable to bear the same heat treatment without fracture. Furthermore, the broken surfaces of certain porcelains show a difference in character, particularly those bodies high in silica and low in alkalis. Such bodies, if broken mechanically, show a rough fracture surface, which might lead a casual observer to imagine that the body was not properly vitrified. Yet if the same porcelain be cracked by injudicious heat treatment, the fracture surface is vitreous and shiny; and such indications as these support the idea that, in the process of fracture by rapid temperature change, internal stresses are set up differing from those arising from mechanical stresses in that in the former there is a molecular movement factor absent from the latter.

Apart from the correctness of this theory in every detail, it has nevertheless been the one under the guidance of which the development of hard chemical porcelain at Worcester

FIG. 4.—PHOTOMICROGRAPH OF THE GLAZE OF ROYAL WORCESTER LABORATORY PORCELAIN. MAGNIFICATION 500 DIAMS. THIS SECTION IS CUT CLOSE DOWN TO THE SURFACE OF THE BODY FROM WHICH THE SILLIMANITE EXTENDS OUTWARD INTO THE GLAZE.

was effected, and from the reproductions of photomicrographs shown in Figs. 1—3 some idea can be obtained of the efficiency of sillimanite formation, which formed the aim of the research. The body figured would contain 45 per cent. of crystalline aluminium silicate if the efficiency was 100 per cent., and as the actual sillimanite present is estimated at 40 per cent., the efficiency approximates to 89 per cent.

Since an accurate method for the determination of the sillimanite content of a porcelain is not available the efficiency of its formation cannot be stated precisely. That obtained in the Worcester ware, however, is known to be among the highest obtained in best quality chemical porcelains, with which it compares very favourably in its resistance to fracture on rapid temperature change.

Industrial and Other Conditions in India

By Wilfred Wyld, F.C.S.

Mr. Wilfrid Wyld, consulting chemist, of Leeds, who recently had to return from India owing to the climatic conditions and has only recently recovered sufficiently to attend to business, contributes the following notes in the hope that they may be of benefit to readers who contemplate taking up posts in India or other tropical countries.

THE first and most important point to consider is the reliability of the firm or individual with whom dealings are to take place. After having ascertained the *bona-fides* of the future employer or partner, it is advisable to have a proper and satisfactory agreement prepared. The writer knows of many cases where young men—and even older ones—have become stranded abroad without the wherewithal to make the return passage.

It is, therefore, necessary to see that an equitable agreement is drawn up. Such should include the payment of passage out and the return journey. Where steamship companies only issue a return allowing for a maximum residence of two years abroad, the amount of the return passage should be deposited in the bank in the name of the traveller, should he be desirous of staying a longer period.

Proper accommodation should be provided, but where there is much pioneering work to be done, this cannot always be expected at the outset, and the use of tents, or even galvanised huts, may have to suffice for a time.

A number of white cotton ducks are useful, but shorts of khaki are preferable, and most comfortable. Leggings are very necessary for the monsoon, or for travelling in the jungle. A thick topee must be worn whenever the sun is out, and an umbrella is required for sun or rain.

Upon disembarkation, our friend may have to take a long train journey amid scenery sometimes terrible, sometimes lovely, occasionally skirting awful depths. Upon arrival at the scene of his future activities he will require some days to get the "hang of the land." He will be advised to do this and do that, but common sense must prevail. The most important point to remember is the precautions in the drinking of water. It is always advisable to see that it is boiled and filtered.

If accommodation be provided near the works, there is the advantage of not having to expose himself to the heat of the sun in the long walks to and from them.

Labour and Staff Problems

Having visited the factory and learned his duties, the question of the *personnel* and language gives him some scope for deep thinking, but he can get along very well without first learning the dialect—English being spoken almost everywhere.

There is plenty of cheap labour in India, for nine out of every ten of its inhabitants live in mud huts or hovels. Generally all the members of the family work, so very small pay is usual. Women coolies only get 6d. or thereabouts per day, the men labourers double this rate, but the "heavy gang" demand 2s. Fitters receive from 3s. 6d. to 4s. per day. Chemical plumbers—who are very indifferent in skill—earn £9, masons and carpenters £8 per month, process workers 3s. 6d. to 4s. per shift of eight hours, watchmen (Sepoys) £2 per month.

With regard to the staff: the chief clerk receives £9 per month, and B.Sc. chemists will come in shoals for £5 per month, and the chief chemist for £12.

The usual red bricks obtainable are of very inferior quality; in many cases it is the plaster inside and outside the building which holds them together. The price is about 27s. per thousand. Fire bricks are of somewhat better quality, and run to 35s. per hundred. Castings cost 18s. to 25s. per cwt., and fabricated steelwork 20s. to 25s. per cwt. Carriage in India is very heavy. Castings cost 4s. 9d. per ton for 30 miles; coal 1s. 6d. for the same distance. The quality of the coal mined is very low in calorific value, and the better classes have to be imported. The cost of local coal is 25s. to 30s. per ton delivered. Electricity from the hydro-electric companies is very largely used, and can be got for 1d. to 4d. per unit, according to the amount consumed.

In spite of the rapid progress made in recent years all over the world, the bullocks hold their own in India. Though slow, the bullock has many qualities to commend him. He is usually good tempered, easily managed, and quickly yoked. He can travel considerable distances without water, and can feed by the roadside, from scrub, whereas chaff or corn must be carried for horses in similar conditions. The bullock is also dependable, for in the deep swamps or rough roads after heavy rains, the patient animal toils all day with only short rests.

Mineral Wealth and Chemicals

There is vast unexplored mineral wealth in the country, and any one who is able to stand the climate and has the inclination can find plenty to do. The manufacture of sulphuric acid is established in many parts of the country, but the plants are not fully occupied, although the quality of the acid is of the best, being produced from imported sulphur. Pyrites is found in distant parts, but is very low in sulphur and contains much barytes. So far, this source of sulphur has not been utilised.

The output of acid is packed in jars and carboys, only occasionally in drums. Hitherto, the railway companies would not accept acid in tank cars, and it was with the utmost difficulty that the writer convinced the largest company to agree to its transportation in steel vessels. But even then they would not accept acid of lower strength than 95 per cent., owing to the fear they had of damage to their rolling stock.

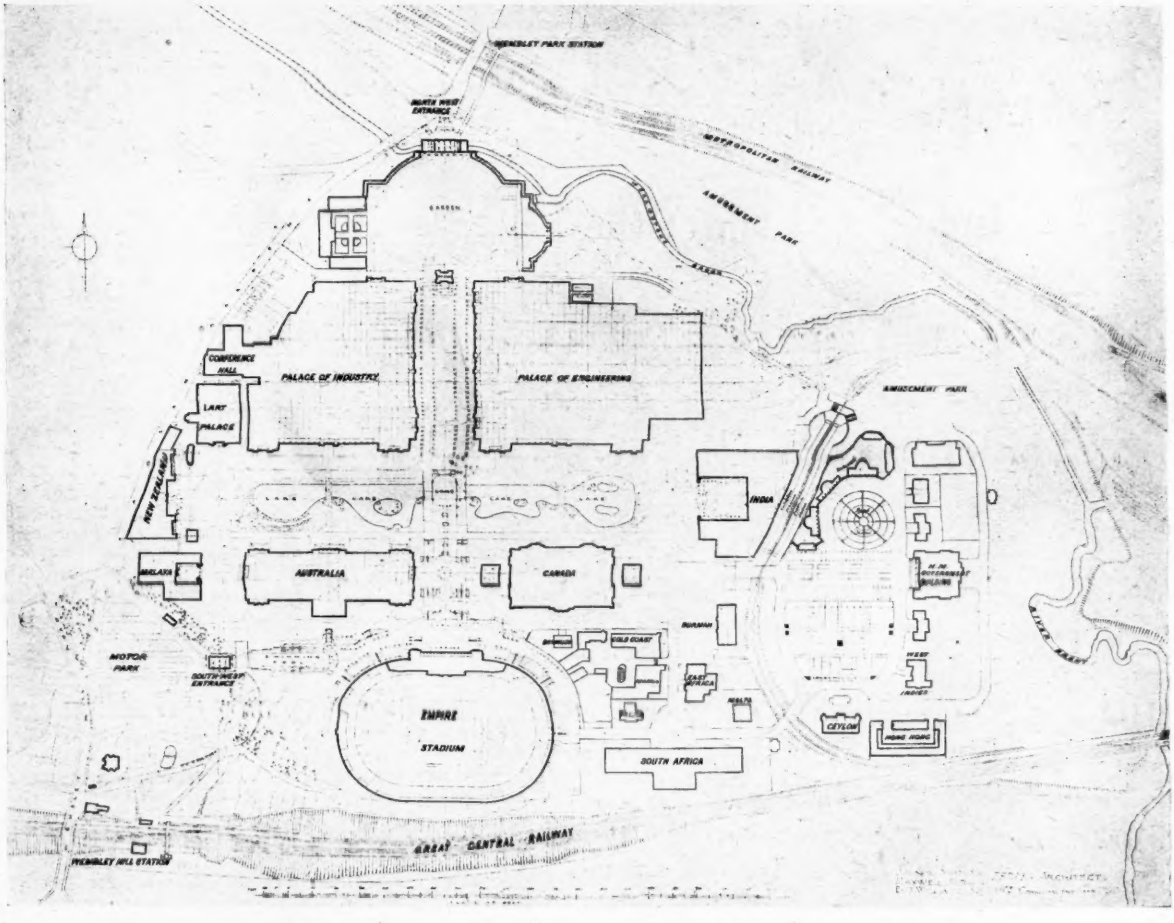
The cost of the carboys mentioned (capacity 5 gallons) is 5s. each, owing to the glass manufacture being in a primitive state, and many concerns have failed through their oversight in not placing their factories near the source of sand or fuel. The cost of soda ash used is a heavy item in the process, for partial replacement of this with cheaper substitutes is rarely met with.

The superphosphate trade is, as yet, far from being on an extensive scale, and until this is developed the demand for sulphuric acid will remain much below the capacity of the many plants now in existence. Again, the farmers have little incentive to lay up capital; they want to see the results too quickly, and manufacturers would have to give them credit for considerable periods.

In conclusion, India is a very fascinating country, and fully repays a visit; but one should obtain medical advice before taking up residence there for a long period. The writer does not recommend any one of middle age to take undue risks. Many people have found it necessary to return home within a very short period after arrival, an occurrence which is to be deplored.

The Dyestuffs (Import Regulation) Act

IT is rumoured in some quarters that propaganda is contemplated for the repeal of the Dyestuffs (Import Regulation) Act, the high price of British-made dyes being the determining factor so far as many users are concerned. From the user's point of view, the attitude of the dyeing trade generally is said to be in favour of a repeal of the Act. In the event of such action, it is felt that prices would come down very rapidly.



The British Empire Exhibition, 1924

Advance Description of the Chemistry Section

THE Chemical Section of the British Empire Exhibition, to be held at Wembley Park next year, will be remarkable in many ways, particularly in its size and the comprehensiveness of its scope. The site which has been secured may be discerned on a close examination of the plan reproduced on this page, and is located in the Palace of Industry, and occupies the oblong in the north-east corner of that building which is defined by the north and east main doorways (the two doorways themselves can be seen clearly in the plan). It will thus be seen that the section has one of the premier positions in the whole exhibition, and will be the first part reached by a visitor who enters at the north entrance (marked "north-west" on the plan), from Wembley Park Station on the Metropolitan Railway.

The designs provide for what is practically an independent hall within the Palace of Industry, and this hall, both inside and outside, has been designed by a prominent architect throughout—Mr. Clough Williams-Ellis. One of the features of the outside will be a specially painted frieze running right round the exterior, with scenes representing the chemical industry. The total area of the chemical hall is about 37,000 sq. ft. and it is bounded entirely by two main 75 ft. gangways and the outside wall of the palace, and so is quite independent of other exhibits. The total cost of the chemical exhibit alone is estimated at about £100,000.

Inside the hall there are spaces for 94 British firms, such structures as are necessary with these exhibits being designed by the architect. These do not resemble the ordinary individual stand commonly used, but are of a more permanent nature and are all in harmony with the main scheme. The firms are representative of the whole industry and include those that do not ordinarily exhibit at trade fairs. In addition to the commercial portion of the exhibit, there is to be a kind of inner enclosure devoted to displays of the scientific apparatus upon which so much of the industry depends. This section alone will be remarkable in gathering together in one place a wide range of experimental apparatus, illustrating the most recent discoveries in various fields. The object of this section is, of course, purely to add to the publicity value of the whole in showing that the British chemical industry is based upon the research and invention of British scientific workers, and it is interesting to note that it is being arranged by Dr. Levinstein. It is, of course, too early as yet to state exactly what apparatus will be demonstrated here, or to give any details of the commercial exhibits. These latter are to be roughly grouped in four sections—dyestuffs, heavy chemicals, fine chemicals, and soap and perfumery—which are to be arranged in that order from north to south inside the hall. The scientific enclosure is to be against the east wall of the hall, in the centre.

At the moment the Palace of Industry is not yet completed, but it is expected to be ready during November, enabling the work of erecting the Chemical Hall to be commenced. From what has been written above, it will be seen that the exhibition of the chemical industry will be something more than has ever been attempted before, and the same is true of the whole. The Palace of Industry covers eight acres, and the Palace of Engineering is even larger. In these two enormous buildings the British home exhibits are to be housed, but the Dominions are each to have appropriate buildings in which their particular industries will be displayed. The Canadian Building, for example, will include chemical exhibits, so that it is not only in the British section that the chemical industry will emphasise its importance to the life of the community.

D

Chemical Trade Openings Abroad

We give below further selections in our series of reports on chemical trade conditions in various parts of the world, which have been specially compiled from the latest available information.

The Argentine Republic

NOT to any extent an industrial country, the Argentine Republic requires to import practically all its chemical requirements, some of which are of no small importance. The products, in which British manufacturers excel, such as soaps and alkalis, will be found on perusal of the following table to be imported in large quantities.

		1920	1921
Acid, sulphuric	cwts.	725	1,262
Acid, tartaric	,,	2,491	344
Sulphate of alumina (including alum)	tons	1,611	1,848
Coal tar oil, creosote oil and other heavy coal tar oils	gallons / cwts.	278,500 / 24,221	39,185 / 3,578
Unspecified coal tar products		2,149	1,438
Disinfectants, insecticides, etc.	cwts.	203,376	64,922
Iodine and iodides	lbs.	2,779	1,196
Red lead	cwts.	3,661	761
Sodium carbonate	,,	194,468	200,083
Sodium caustic	,,	30,206	51,241
Sodium silicate (water glass)	,,	48,757	44,651
Other sodium compounds	,,	3,035	4,617
White lead (basic carbonate)	,,	19,154	7,084
Painters' colours (ochre and earth)	,,	7,847	4,037
Painters' colours, ground in oil or water	,,	33,328	12,739
Paints and enamels (including ready mixed)	cwts.	19,336	13,027
Unspecified paints and enamels	,,	10,531	6,879
Total of painters' colours and materials not elsewhere specified	cwts.	90,783	44,166
Oils, fats and resine, manufactured (candles)	cwts.	17,818	7,639
Essential oils (natural)	lbs.	5,518	1,374
Essential oils (synthetic)	,,	991	5,027
Soap, household and laundry	cwts.	22,930	5,083
Soap, toilet	,,	1,113	335
Varnish (not containing dutiable spirit)	gals.	120,804	64,721

Australia

AUSTRALIA provides a peculiarly suitable market for the British chemical manufacturer. Apart from the absence of difficulties arising from exchange fluctuations there is a decided preference for British goods which is fostered in many ways, not the least being the specially favourable tariff. Recently branches of the Empire Development Union have been established in Victoria and New South Wales, and Sir Granville Ryrie, president of the Australian branches of the union, has been engaged in organising the Queensland section of the movement. Speaking in Brisbane, he said the object of the Empire Development Union was to promote trade within the British Empire. An endeavour would be made to educate the public generally in the full appreciation of the great resources of the Empire, and the manner in which these resources can be utilised for the benefit of all its citizens. The union also would undertake a campaign of propaganda with the object of arousing the public to a sense of their obligation to discriminate in favour of Empire-made goods, and to secure the co-operation of retailers in this direction. Their slogan was "Empire Goods for Empire People."

There is, however, now a considerable development of chemical industry in Australia and though this will undoubtedly increase the demand for certain products, it is impossible for importers to cut their prices below those of the Australian producers as protection is rigidly enforced, and dumping duties are levied to bring up the prices of imported goods. A number of articles of foreign and British manufacture, concerning which importers in the Commonwealth have lodged complaints with the Tariff Board, have recently been subjected to dumping duties. It is alleged that the goods in question are being supplied at less than fair market value, or at prices that would be detrimental to Australian industries, owing to depreciated currencies. The articles include Canadian varnish, caustic soda from the United Kingdom, French brandy, the landed cost of which is less than the Australian wholesale price of similar brandy of Australian manufacture, and calcium carbide from Jugo-Slavia.

The needs of Australia in chemical products are however considerable, as the following selections of import statistics show :—

		1921
Ammonium carbonate	tons	60
Ammonium chloride (muriate)	tons	252
Borax	cwt.	11,944
Chloroform	lb.	29,099
Coal tar products (unspecified)	cwt.	1,036
Copper sulphate	tons	301
Disinfectants, insecticides, etc.	cwt.	4,868
Potassium ferro and ferri-cyanides (yellow and red prussiate)	tons	57
Sodium carbonate	cwt.	368,394
Caustic soda	cwt.	26,067
Finished dyestuffs	cwt.	4,826
White lead	cwt.	18,639

Synthetic organic chemicals for photographic purposes, cream of tartar, and zinc oxide are also largely imported.

New South Wales and Victoria absorb by far the greater proportion of sodium carbonate, caustic soda, white lead and dyestuffs, these being the only items for which detailed figures are available. We may mention for example the case of caustic soda, out of the total of 26,067 cwt. imported in 1921, 11,047 cwt. went to New South Wales and 9,199 cwt. to Victoria. These figures are indicative of the proportionate distribution of the other products.

Brazil

THE chemical position as regards Brazil is similar to that of Argentina, except that as the country is not so highly developed the chemical needs are less. It will be noticed that the chief requirements are in the nature of manufactured products based on chemical processes rather than chemical themselves. Financial assistance has been given by the Brazilian government towards the establishment of factories manufacturing caustic soda which accounts for the falling off in the imports of soda compounds. A considerable outlet for chemical products remains, however, as will be seen from an examination of the import figures given below.

		1920	1921
Acid, hydrochloric	cwts.	1,478	138
Acid, sulphuric	,,	2,175	719
Sulphate of alumina (including alum)	,,	579	158
Ammonium compounds carbonate	tons	132	8
Arsenic, white	,,	200	8
Bleaching powder (chloride of lime)	cwts.	20,272	3,552
Borax	,,	4,044	1,553
Camphor		146	28
Sulphate of copper	tons	415	15
Disinfectants, insecticides, etc.	cwts.	29,488	2,591
Iodine and iodides	lbs.	3,596	2,301
Red lead	cwts.	4,540	1,902
Magnesium compounds (including chloride and sulphate)	tons	321	29
Potassium chlorate	,,	788	1,445
Potassium cyanide	,,	130	12
Potassium nitrate (saltpetre)	,,	22,355	1,578
Sodium carbonate	,,	128,513	91,265
Sodium caustic	,,	83,138	39,239
Sodium cyanide	,,	3,144	4,012
Sodium silicate (water glass)	,,	25,846	8,232
Unspecified sodium compounds	,,	4,283	2,525
Zinc oxide	tons	161	13
Quinine and quinine salts	ozs.	184,852	34,090
Alizarine	cwts.	544	237
Unspecified dyestuffs (coal tar)	,,	1,256	436
White lead (basic carbonate)	,,	1,547	548
Painters' colours (ochre and earth)	,,	695	328
Prussian and other blues	,,	694	149
Paints and colours, ground in oil or water	,,	16,676	5,130
Paints and enamels (including ready mixed)	,,	10,746	3,802
Unspecified paints and enamels	,,	7,872	3,972
Total of painters' colours and enamels not elsewhere specified	cwts.	38,516	13,985
Essential oils, natural	lbs.	5,108	1,829
Soap, household and laundry	cwts.	2,713	195
Varnish (not containing dutiable spirit)	gals.	26,506	7,756
Wax, paraffin	cwts.	897	2,318

Canada

AN official tour was made by H.M. Trade Commissioner at Toronto (Mr. F. W. Field) to cities and towns in Western Ontario during the early part of May and the latter end of June. A large number of calls were made upon manufacturers, who are importers of various commodities, merchants, and others likely to be interested in sources of supply in the United Kingdom.

These official tours, which are a part of the duties of all of H.M. Trade Commissioners, are believed to be of considerable value in relation to the expansion of British trade. In the case under review, contact was established or maintained with Chambers of Commerce, Industrial Commissioners, Purchasing Agents, and others interested. The Trade Commissioner reports that business men in Ontario generally appreciate the work of the Department of Overseas Trade in assisting to develop British trade there in face of keen foreign competition. He adds that he is always given a friendly reception and every possible assistance. Considerable publicity in the interests of British trade was also secured through Press interviews at the various points visited.

Inquiries were received by the Trade Commissioner during his tour for prices of United Kingdom manufacturers of yarns, dyeing machinery, alloy steels, wire-drawing machinery, paper tubes, vegetable parchment paper, fluospar, duck filter cloth, soda ash, etc. These were brought to the notice of United Kingdom firms. A recent inquiry of this character has led to an important new connection for United Kingdom chemical manufacturers.

Silk Dyeing

A visit was made to the silk dyeing works which were recently established in St. Catherine's, Ontario, where it was learned that a considerable volume of silk goods in the grey are being imported from foreign countries and dyed locally. A special report on this matter is available to firms interested upon application to the Department of Overseas Trade.

American Branch Works

American companies continue to erect branch works in Western Ontario. Two of the most recent additions are the United States Light and Heat Co. and the Dominion Insulator and Manufacturing Co. The latter firm are one of two insulator manufacturers in Ontario which specialise in high voltage work. Clay is imported from the parent company prepared ready for use in the Canadian works.

The establishment in Canada of so many branch works of United States firms naturally tends to divert trade to the United States. Many of the Canadian branches purchase a substantial portion of their requirements through their head office in the United States which in some cases entirely controls the purchasing policy of the Canadian branch. Production costs in Ontario are frequently reported as being higher than in the parent works in the United States.

It was recently estimated by a reliable authority that more than two hundred branch factories were opened in Canada by Americans in 1919, and a great number in 1920 and 1921, and that late in 1922 there must have been over seven hundred such establishments, with a further number seeking suitable locations. One of the incentives for this development is that the American manufacturers can thus supply the Canadian market and at the same time escape the Canadian tariff. Another is that by manufacturing in Canada they are able to enjoy the preferential treatment accorded to Canadian goods by many countries within the British Empire, while, under the terms of an agreement with France existing since 1907, Canada's products enter that country under especially favourable conditions.

A number of United Kingdom manufacturers are believed to be considering the matter of branch works in Canada, particularly in Ontario and Quebec Provinces. These include makers of artificial silk yarn and engineering lines.

Chemical Industries

The Norton Company propose to enlarge its electric furnace plant at Chippewa, near Niagara Falls, by adding a furnace building to be used exclusively for the manufacture of a carbide of silicon abrasive known as Crystolon. The development will cost about $165,000 and ensure a 25 per cent. increase in production of this line.

There are two cities bearing the name of Niagara Falls. One is in Ontario and one in New York State. They face each other, the river dividing them. Both are the sites of important industries. The Falls themselves are just as much a Canadian institution as they are American, and the famous "Horseshoe Falls" of Niagara are in Canada. Power is developed at Niagara Falls, Ontario, by the Hydro Electric Power Commission of Ontario, for long distance transmission to all parts of Ontario and to several parts of New York State.

The American Cyanamid Co. have works at Niagara Falls, where the company's output is equally divided between cyanamid, one of the raw materials of fertiliser, and cyanide, used in mining. The mining industry has shown marked improvement, with the result that sales of cyanide have been made to the gold mines in the South African Rand as well as in Canada, the United States, and Mexico.

British manufacturers have made some headway recently in securing a share of Ontario's import trade. This is true of the woollen, hosiery, and chinaware trades particularly. British trade has also been fairly good in fancy leather goods, sporting goods and cloths, chemicals, and, to a lesser extent, in metals and machinery. The competition to be met in Ontario is very keen in the majority of lines, both from Canadian and United States manufacturers.

Visits to Canada

The Trade Commissioner has again strongly recommended a personal visit of United Kingdom manufacturers to the Ontario market in order to appreciate fully the difficulties which United Kingdom manufacturers have to solve in order to secure a profitable amount of the business offering. Indeed, he states that unless the United Kingdom manufacturer is fully conversant with what is termed the "selling atmosphere" of the market little success is likely to result from efforts to establish or extend trade in that particular market.

The Canadian manager of branch works of a United Kingdom manufacturer of engineering equipment has suggested that United Kingdom firms establishing works in Canada should consult the Trade Commissioners in regard to other branch houses there in order that equipment and supplies may be purchased as far as possible from other United Kingdom firms in Canada, rather than from foreign suppliers.

Chile

THE market for chemicals generally in Chile is not satisfactory, particularly for pharmaceutical products, owing to import duties and the general conditions being unfavourable. There is, however, a very fair demand for soaps, paints, disinfectants and similar products. The following figures showing the quantities imported recently are of considerable interest.

		1920	1921
Disinfectants, insecticides, etc.	cwts.	22,825	4,261
Red lead	,,	1,295	689
Sodium, caustic	,,	13,115	15,686
Sodium silicate	,,	6,684	1,201
Unspecified sodium compounds	,,	3,952	4,371
White lead (basic carbonate)	,,	469	790
Painters' colours and materials (ochre and earth colours)	cwts.	1,276	866
Paints or colours ground in oil or water	,,	20,144	5,259
Paints and enamels, prepared	,,	8,189	3,206
Unspecified paints and enamels	,,	18,922	2,864
Painters' colours and materials not elsewhere specified	cwts.	49,993	13,073
Oils, fats, resins, manufactured (candles)	,,	1,135	154
Soap, household and laundry	,,	18,173	3,407
Varnish, not containing dutiable spirit	gals.	11,269	6,152
Wax, paraffin	cwts.	2,321	9,539

It is, however, of interest to note that the Department of Overseas Trade has decided to re-establish forthwith the post of Commercial Secretary for Chile. Mr. W. F. Vaughan Scott, lately Commercial Secretary for Czecho-Slovakia, has been appointed to the post. Mr. Vaughan Scott previously served as Commercial Secretary at Santiago up to the time when the post was closed in May, 1922. He will leave England on October 11, and on arrival at Santiago will take steps to secure suitable office accommodation for the commercial secretariat.

New Zealand

THOUGH the chemical requirements of New Zealand are not very large there is quite a considerable market for the British trader which has many points of advantage over other countries. There is, for example, a favourable British preferential tariff and a general sentiment in favour of goods from the "Old Country." There are also no difficulties with regard to exchange fluctuations. With regard to "raw" chemicals there appears to be a good demand for sodium compounds. For instance, in 1921 22,700 cwt. of sodium carbonate were imported, in addition to 7,270 cwt. of caustic soda. The figures for other sodium compounds for the same year are as follows: Sodium cyanide, 3,398 cwt.; sodium silicate (water glass), 4,530 cwt.; borax, 1,868 cwt.; sodium compounds not otherwise classified, 7,591 cwt.

Disinfectants, insecticides and similar products are required for many purposes, and in 1921 16,000 cwt. were imported. Dyestuffs are used in the local dyeing industries and 456 cwt. of finished dyestuffs (mostly from coal tar) were imported in 1921. As might be expected in a non-industrial country the demands for many chemical substances are very small, but such associated products as paints are imported in considerable quantities. Thus in 1921 the figures for painters' colours ground in oil or water were nearly 11,000 cwt. Prepared paints and enamels totalled 11,023 cwt., while other paints, including leaded zinc white and basic lead sulphate, showed a figure of 11,464 cwt.

Canadian Salt, Gypsum and Cement

THE output of salt from all sources in Canada during 1922 amounted to 183,438 tons, of which quantity approximately 99 per cent. or 181,794 tons, valued at $1,628,323, was sold. As compared with the sales for 1921, the 1922 records showed an increase of 10,811 tons or 6·6 per cent. in quantity and a decrease of $45,362 or 2·7 per cent. in value. Ontario continued to be the chief producer, contributing 97·2 per cent. of the total amount sold. Nova Scotia shipments, from the Melagash mine, amounted to 5,053 tons of common coarse, land and rock salt. The total quantity of salt produced was made up of table and dairy salt 41,274 tons, common fine 35,758 tons, common coarse 28,096 tons, land salt 6,964 tons, other grades 7,636 tons and brine for chemical works (salt content) 63,710 tons.

Gypsum

The total output of gypsum rock in Canada during the year under review amounted to 484,629 tons, of which quantity 145,954 tons or 30 per cent. was calcined. The quantity quarried by provinces was: Nova Scotia 281,861 tons, New Brunswick 56,692 tons, Ontario 106,829 tons, Manitoba 39,147 tons and British Columbia 100 tons.

Exports of all grades of gypsum during 1922 were valued at $2,160,898, an increase of $375,360, as compared with 1921. The 1922 production included lump or mine run, crushed fine ground and calcined gypsum sold; calcined gypsum used in the calcining plants for the production of wall plaster, alabastine and other gypsum products were also included. The average value per ton received by operators throughout Canada was, by grades, lump $1·52, crushed $2·26, fine ground $6·22 and calcined $10·67. Prices during 1921 averaged as follows: lump $1·78, crushed $2·56, fine ground $3·42 and calcined $10·61.

Cement

The total mill output of cement during 1922 was 6,447,696 barrels valued at $14,324,715, a decrease of 1,960 barrels, as compared with 1921. No puzzolan cement was produced during the year. Ten plants, having in all a daily output of 35,338 barrels, were operated during the year. In addition to these there were at least twelve other plants in the country which were idle during the whole period.

The principal producing provinces were Ontario and Quebec, sales from the former amounting to 3,104,386 barrels, averaging $2·06 per barrel, and from the latter 2,660,935 barrels at an average price of $2·22. The selling prices in the other provinces were as follows:—Manitoba $2·62, Alberta $2·33, and British Columbia $3, with a Dominion average of $2·22 per barrel. Stocks of cement in hand as at December 31 last amounted to 1,106,939 tons, as compared with 1,603,215 tons at the end of 1921.

The Mining Industry in South Africa

IN the course of an article in the *South African Railways and Harbours Magazine* on the Position and Prospects of South African Industries, the writer, Mr. H. C. Hopkins, observes that for over thirty years prior to the late war, diamond, gold, coal, and base-metal mining constituted practically the only industries of the country excepting agriculture and the constantly expanding Government railway system.

Diamonds

As a field for permanent and constant employment diamond-mining has proved thoroughly unstable; dependent for prosperity, as this industry is, upon the vagaries of international finance, it periodically throws upon the country an army of white and native unemployed. Large numbers of workers who have been attracted to this industry to the almost certain detriment of other industries have been thrown out of employment at times when their absorption by other industries was impracticable, if not almost impossible. The strain placed upon the resources of a young country like South Africa by such debacles in the diamond industry will be understood from the fact that in 1920 this industry gave employment on the average to 56,922 persons, and to only 26,694 in 1922.

Gold

Although to some degree fluctuating, other forms of mining offer a more certain and stable field for employment so long as working costs can be kept within economic bounds; but there are limitations to their capacity to absorb the white worker, as here, again, the unskilled occupations are allotted to the native at low rates of pay. Gold mining is said to have reached its zenith in South Africa. This, in Mr. Hopkins' opinion, is still a debatable point, and is dependent apparently upon the maintenance of working costs within economic limits. Continuous research work produces new ideas, and with constantly improved and cheapened methods of extraction it seems probable that huge quantities of ore of low gold content, now untouched, may be brought within the limits of payability. Improved and cheapened methods of treatment will also attract capital for the development of other known large gold fields which are still unproclaimed and unworked. The Government Mining Engineer has estimated that there are still available 440 million tons of ore which will yield between 3 and 4½ dwt. of gold per ton, in addition to 340 million tons carrying 4½ dwt. and over.

It may be that manufacturers overseas have been deterred from investigating the potentialities of South Africa through a fear of the decline of gold mining; but let them ponder well the foregoing, and if they will also consider the progressive activities in other forms of mining—coal, iron, copper, tin, silver, mica, asbestos, corundum, lead, zinc, talc, manganese, nickel and oil shale—it will be apparent that long before gold mining has become exhausted other forms of mining may have filled its place. Yet further possibilities exist in osmiridium, platinum, vanadium, molybdenum and other rare metals which only await enterprising exploitation.

Coal

The coal mining industry of South Africa has long since reached the point where it is dependent for further expansion upon the bunkering and export trade or the establishment of by-product industries as auxiliaries. Coal is mined probably more cheaply in South Africa than in any other country, and, although so far distant from the coast, the cost of railage to the harbours is sufficiently low to permit of shipment at remunerative rates when vessels are available. Coaling equipments at South African ports are of modern design and of a capacity to ensure rapid loading, while through a system of grading by Government officials the coal shipped is of dependable quality. The known coal reserves of South Africa have recently been estimated at 56,200 million tons.

New Radium Deposit Discovered

THE Radium Institute at Petrograd reports that an expedition sent to Ferghana, a province of Russian Turkestan, has discovered the world's largest deposit of radium. It is thought that, as a result of this discovery, the price of radium might be brought to the point where it could be put into every hospital in the land and made available to the masses, whereas both scarcity and price make it prohibitive now.

Work of the Government Laboratory

Official Report for the Year

THE report of the Government Chemist (Sir Robert Robertson, F.R.S.) upon the work of the Government Laboratory for the year ended March 31 last has just been issued.

The report states that the chemical work of the following departments is performed wholly or in part in the Government laboratories—Admiralty, Ministry of Agriculture and Fisheries, Air Ministry, Colonial Office and Crown Agents for Colonies, Board of Customs and Excise, Geological Survey, Ministry of Health, Board of Inland Revenue, Ministry of Pensions, Post Office, Department of Scientific and Industrial Research, Home Office, Board of Trade, War Office, Office of Woods and Forests, and Office of Works.

The work of most of these departments is carried out at the Laboratory at Clement's Inn Passage. The Laboratory at the Custom House, London, deals especially with Customs samples, while the chemical stations to which reference is made in connection with the work for the Board of Customs and Excise deal with Customs samples and some Excise samples. In addition, the Department maintains the laboratory in the Geological Survey Museum for the analysis of ores for the Survey, and carries out the inspection of food stores and supplies for the War Office at the Supply Reserve Depot, Deptford, where also there is a laboratory.

The total number of samples examined in the course of the year, including those dealt with at the chemical stations, is 343,453 as compared with 302,562 in the preceding year, an increase of 40,891. There has been an increase of more than 26,000 in the number of the samples examined at the chemical stations, while the number examined at the central laboratories in London has risen from 210,340 to 225,073, an increase of 14,733. The samples of wine have increased from 61,683 to 85,776, of sugar from 42,715 to 49,172, and of tobacco offal and waste from 31,851 to 35,545, while there are notable increases in the numbers of samples of wort and exported and imported spirituous preparations. The number of samples of beer for the detection of dilution is again high, the number being 5,079, as compared with 4,650 in the previous year and 854 two years ago. There has been a decrease of 5,500 in the number of samples of tea. As pointed out last year, the work in connection with the Safeguarding of Industries Act brought 3,000 samples in the six months of its operation included in last year's report. The number of samples in the present year is nearly 8,000. The Dangerous Drugs Act and the Dyestuffs (Import Regulation) Act continue to impose considerable work on the Department.

Chemical work is performed for the Admiralty in connection with the Contract Department at Whitehall, the naval yards, the engineering department, the canteen inspections, the hospitals and schools, and the Medical Branch. The Contracts Branch of the Admiralty submitted 76 samples of food on tender for report as to conformity with specification and opinion as to relative merits. The technical examining officers at the victualling yards forwarded 317 samples from supplies and from returned stores for examination and report, many of the samples being submitted with the object of preventing the issue of canned goods contaminated with metals.

Other samples, to the number of 79, included some non-ferrous metals, soaps, fabrics for sail cloths, paints, glazes, and glazed ware.

The total number of samples for the Admiralty was 472. This number does not include the sea-water samples forwarded by the Admiralty for the determination of salinity.

Ministry of Agriculture and Fisheries

The samples submitted by the Ministry of Agriculture and Fisheries and the Board of Agriculture for Scotland may be classified as follows :—(1) Imported dairy produce and margarine. (2) Butter and margarine taken at factories. (3) Sheep dips. (4) Water and pollution of rivers. (5) Sea-water. (6) Substances under the Fertilisers and Feeding Stuffs Act. (7) Substances under the Merchandise Marks Act. (8) Miscellaneous articles.

The Government of Northern Ireland forwarded 22 samples, and the Irish Free State 10 samples, of imported dairy produce. The Irish Free State also forwarded 205 samples of sea-water.

During the year 22 fertilisers, including one from Scotland, and 22 feeding stuffs have been reported upon. The fertilisers consisted of basic slag, basic phosphate, superphosphate, potash salts and sulphate of ammonia. In most cases the amount of nitrogen, phosphates or potash was less than the guarantee stated. Seven samples of basic slag and basic phosphate were deficient in citric-soluble phosphates to an extent exceeding the limits of error prescribed in the Ministry's regulations, and in five cases the basic slags were deficient in total phosphates, two of the samples containing only 71 per cent. of the guaranteed quantity. Two samples of basic slag were found to contain mineral phosphate mixed with the slag. A sample of phosphate of ammonia was found to be deficient in nitrogen, and to contain 0·33 per cent. of free sulphuric acid and 5·0 per cent. of water, the deficiency in nitrogen probably being due to the absorption of water by the free acid in the sulphate.

Customs and Excise

The work for the Customs and Excise Departments consists mainly in the examination of samples in connection with the assessment of duty and drawback, or with the regulations and licences relating to the manufacture and sale of dutiable articles—*e.g.*, beer, brewing materials, table waters, potable spirits, methylated and other denatured spirits, wines, tobacco, sugar and sugar products, saccharin, coffee, cocoa and matches. Samples of tea taken by the Customs and Excise on importation under the Sale of Food and Drugs Act, 1875, of imported dairy produce taken for the Ministry of Agriculture and Fisheries and the Ministry of Health in connection with the administration of the Sale of Food and Drugs Act, 1899, and the Public Health (Milk and Cream) Regulations, 1912; and samples taken from imported goods in connection with the administration of the Safeguarding of Industries Act, the Dangerous Drugs Act, and the Dyestuffs (Import Regulation) Act, are also sent to the laboratory for analysis.

In order to avoid delay in the examination of samples, chemical stations have been established at the more important seaports and one inland town, where samples are tested by Customs and Excise Officers who have been specially trained at the Government Laboratory for this purpose. The chemical station at Liverpool is in charge of one of the chemists on the staff of this Department.

As a check on the work of these officers, the residues from a certain number of samples tested by them are re-tested at the Government Laboratory. The number of such re-tests during the year was 1,148. The results indicated that the testing work at the chemical stations is performed in a highly efficient manner.

The Dyestuffs and Safeguarding Acts

Six hundred and thirty-three samples of imported colours, lakes, and other goods were examined to ascertain whether they contained synthetic organic dyes or intermediate products, the importation of which is prohibited except under licence.

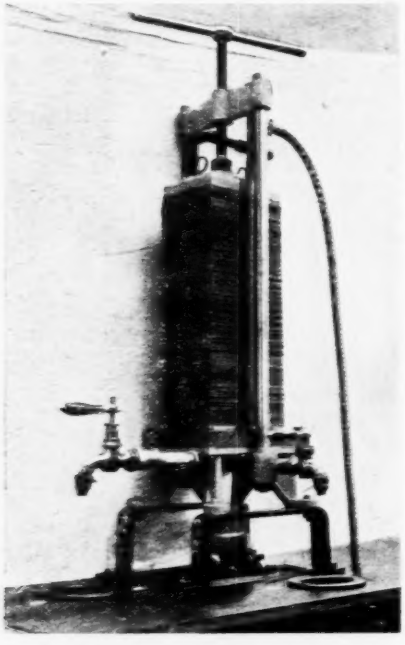
The Safeguarding of Industries Act came into force on October 1, 1921, and nearly 8,000 samples were examined during the year. The object of the examination in most cases was as to (*a*) whether the chemical substance was such as to come within the class of those liable to tax; or (*b*) whether in the case of substances bearing trade names without indication as to their ingredients, such as medicinal preparations, toilet articles and perfumes, the imported article contained any substances liable to tax, and if so in what proportion. The analysis of many of the samples such as medicines, perfumes and proprietary articles, is of an intricate nature, especially as in some cases no information is available as to the composition of the goods.

At the Department of Scientific and Industrial Research in connection with certain preliminary experiments on the steaming of wood, the aqueous extracts were examined to ascertain the nature and proportion of the soluble constituents particularly as regards the organic acids and phenolic substances. Samples of natural gas from boreholes in this country were examined and the proportion of helium determined. This varied from 0·005 per cent. to about 0·2 per cent. by volume.

The Hele-Shaw Stream-Line Filter

Considerable attention has been directed to the "Stream-Line" Filter, invented by Dr. H. S. Hele-Shaw, F.R.S., as a result of the demonstration at the recent Shipping, Engineering and Machinery Exhibition in London. We give below an account of this device, which is capable of producing remarkable results in filtration, in the majority of cases in entirely new directions.

THE principle of Dr. Hele-Shaw's Stream-Line Filter, though of recent introduction, is now fairly well known. An experimental filter was first described by Dr. Hele-Shaw before the Royal Society in April, and in June a similar filter was demonstrated before the London Section of the Society of Chemical Industry (THE CHEMICAL AGE, June 9, 1923, p. 619). The principle of filtering liquids by passing them between sheets



THE STREAM-LINE FILTER: SINGLE UNIT, VERTICAL TYPE.

of metal closely pressed together was apparently first conceived in 1889 by F. H. Danchell, of Maidstone, Kent. The sheets used by Dr. Hele-Shaw however, are of impervious paper with a matte surface and are perforated with alternate rows of large and small holes, arranged as shown in the diagram (Fig. 1). A large number of the sheets are taken and placed together under suitable pressure with the holes registering. The result is a series of large and small tubes running through the length of the pack. The liquid to be filtered is led into the larger tubes and when it is placed under pressure it finds its way into the smaller tubes between the sheets of paper. In the language of hydrodynamics, the larger tubes act as "sources" and the smaller ones as "sinks." Owing to the slight roughness of the paper sheets, they are not in absolute contact, and the liquid is enabled, under pressure, to flow according to the natural stream-line path from the sources to the sinks, as shown in the diagram (Fig. 2). Although the paper pack is not enclosed, there is practically no leakage to the outside owing to the arrangement of the holes.

Special Features

It should be noticed that a filter of this type differs from normal filters in many ways. Thus the liquid does not pass through the pores of the material, but between the sheets, and thus the purity of the filter papers is of secondary consideration compared with their imperviousness. The strength of a normal filter under pressure is the strength of its weakest part, and for working at high pressures special material must be used; but a filter of the Hele-Shaw type is of uniform strength throughout the pack, and can be adjusted to work under varying pressures or with different liquids by altering the pressure on the pack. This latter pressure has a great effect on the efficiency of working. When correctly adjusted the solid material suspended in the liquid to be filtered does not pass between the sheets at all, but remains entirely on the inside of the tube. The sheets removed from a filter after use show no trace of solid material between them but only on the extreme edge of each of the large holes, so that in use it is merely necessary to clear out the holes periodically by means of the device to be described later. The paper itself is thus not subjected to wear by abrasive particles, and owing to its impervious character after prolonged use it is not softened in any way.

Striking Results

Many of the results obtainable from the filter are very striking; thus not only dirty water and oils containing various fine particles of a colloidal nature come through as clear liquids, but *solutions* of dyes pass through as clear water. For instance, a solution of the dye, ethyrosin, submitted to Dr. Hele-Shaw by Professor Vernon Boys, which gives an intense orange with a green fluorescence in a dilution of 1 : 5,000,000, was converted to a very pale lemon colour in one passage of the filter with the sheets under moderate pressure, and a perfectly clear liquid was obtained working with high pressure. These are facts which are readily demonstrable, and should give the theoretical chemist pause to reconsider his ideas on solution.

Professor J. W. Hinchley, when discussing the Stream-Line Filter at the meeting of the Society of Chemical Industry referred to above, pointed out that though the filter added a new machine for carrying out separating work, it must not be imagined that it would displace all other filters. In his opinion it would not displace *any* filter completely, but by its aid certain

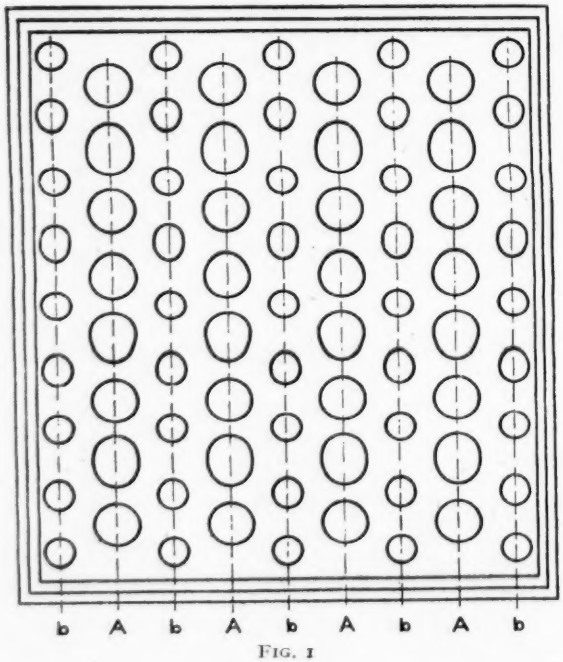


FIG. 1

classes of work could be very much better done. Clearly the filter is not adapted to work where the production of a pure solid product is the principal aim, but it is in the direction of obtaining pure liquids that its greatest uses will probably be found.

Among the various suggestions that have been made for industrial applications of the filter are those in connection with

the refining and clarification of oil. Oil taken from the crankcase of a motor, which had become thin, dark, and full of solid particles of a colloidal nature, when passed through the filter was found to give a perfectly clear yellow oil which was superior to the most highly refined oil in respect to test by extreme cooling, as no cloudiness was produced at a tempera-

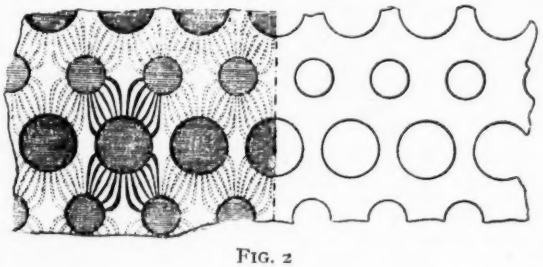


FIG. 2

ture at which the fresh refined oil became opaque. In the manufacture of linseed oil, for example, the filter should be of advantage, as nine months or so are normally required for the oil to clear, the whole of which time can be saved in passing the oil once through the filter, when the suspended materials are completely removed.

The Industrial Form

In its industrial form the Stream-Line Filter is built up of any number of units, either horizontal or vertical, each of which is capable of filtering about 200 gallons of liquid per hour. Each unit is built up of some five thousand or more sheets, about one foot square and of the form shown in Fig. 1. These sheets are compressed by a large screw or a hydraulic ram to the required pressure for the work in hand. The height of a vertical unit may be from one to five feet, and the liquid is passed in through the lower plate to the 32 large holes at a pressure of about 50 lb. per square inch. It then filters through into the smaller holes, and is led off through the lower plate. The pressure on the pack has to be adjusted to suit the nature of the liquid being filtered, but one turn of the screw will reduce the distance between each sheet of the pack by about one-sixty-thousandth of an inch, so that it will be seen that the instrument is very sensitive. The high rate at which such a unit can filter liquids depends of course on the very large filtering surface which is presented, this being equal to the area of the tubes. To take a particular example of a large plant for dealing with 10,000 gallons of liquid per hour, it may be mentioned that about 6 h.p. only is required to force this quantity of liquid at a pressure of 50 lb. per sq. in. through the filter, which consists of sixteen units

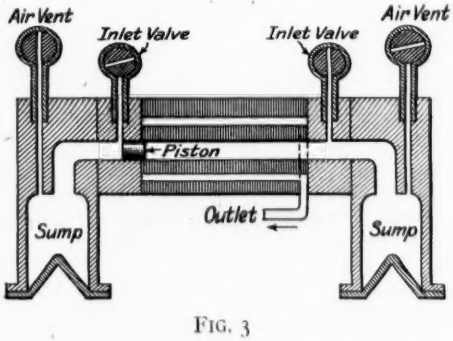


FIG. 3

of 16,000 sheets each, arranged vertically. Each unit is independent and may be cut out of action without disturbing the others. The necessary pressure on the packs is obtained by a small hydraulic pump at the top of each.

Means of Cleaning

The method of cleaning out the tubes without stopping the action of the filter has been ingeniously devised. In each of the large tubes there is a light close-fitting piston. When the liquid is being filtered these naturally remain at the ends of the tubes remote from the inlet owing to the pressure. By means of valves it is possible to reverse the direction of flow in the large tubes so that the pistons are forced to the other end, clearing the solid matter out into the sump. In the horizontal types a sump is provided at each end (Fig. 3), but in the vertical type a sump is provided at the lower end only; the pistons remaining normally at the upper end of the tubes, and being returned to that position immediately, by reverting to the original direction of flow. In this way it is possible to keep the tubes clear without stopping the filter, and so maintain efficient working. To clear out the sump it is of course necessary to stop filtration, but the tubes may be cleared as often as desired.

At the moment it is not possible to say more as to the industrial applications of this filter, but a large number of manufacturers in different directions have already appreciated its possibilities, and doubtless in the near future results will be obtained on a commercial scale which would have been impossible previous to its invention.

The Superiority of British China Clay

Foreign Deposits Reviewed

DEPENDENT as the rest of the world has been upon the unlimited supplies of English china clays from Cornwall, it is, we suppose, only natural that other countries should seek to find, within their own borders, clays approximating in quality and chemical constituents to those they have been in the habit of importing. With rare exceptions foreign exploiters have failed to find anywhere else in the world any kaolins to equal the quality of the best English china clays, but they have succeeded in developing some clay deposits that are at least equal to the common china clays of the West of England.

In no countries are the efforts to find substitutes for our English clays so determined as in America and Canada. There is a lesson in this activity for English china clay producers, and it is for them to get busy to keep their "end up" across the water, where the maintenance of markets is of vital concern to the industry. This can only be done, as has been frequently pointed out, by means of propaganda at least equal in energy and originality to that being undertaken by our friends across the water.

It is a matter of common knowledge that for some time past American users of this invaluable product have lately combined with a view of discovering other sources of supply. Up to the present it is a fact that only a relatively few deposits of good china clay of any commercial value have been found in the U.S.A., these chiefly being in the Southern States; but there are, we believe, other important deposits being worked in Nevada, Colorado, California and elsewhere in America, but of much inferior quality to the British clay. It is now being pressed upon the Federal Government that a systematic geological survey should be undertaken with the view of ascertaining how far the U.S.A. can be made independent of imported supplies, and thus be in a position at least to compete with English china clays.

The Department of Mining recently despatched a special Trade Commissioner to China to investigate the subject, and the gentleman in question, Mr. J. Morgan Clements, has since reported that supplies of high-grade kaolin could possibly be obtained from that Republic after systematic exploitation. He particularly mentions the province of Fukien, which is more favourably situated to supply markets than those at Kiangshi, on the Yangtze, and at Shekwan, near Canton. Mr. Clements also directs the attention of the Department to the promising deposits which have been located, and are to-day being worked, at Foochow, near the South Manchuria Railway, the exports from which centre amount to something like 70,000 tons yearly. This, we may incidentally remark, is virtually the total quantity of china clay now being produced in Cornwall in one month. To assist in the development of this industry, it is proposed to link Foochow with the main line by a narrow gauge railway, an alternative plan being to connect the quarries with the coast, which is only about a mile distant. An additional promising field, producing high-grade clay in fair quantities, is situated close to Tumenling station on the Kirin-Changchun Railway, the possibilities of which, we learn, are now being investigated. In all probability American capital and

enterprise will be employed in the exploitation and development of these sources of supply.

Canada is at last likewise bestirring itself in a more systematic investigation of its china clay deposits, mainly with the view of developing its pottery industry. Up to the present, the only white clay discovered in the Dominion is at St. Remy D'Amherst, near Huberdeau, Quebec, 85 miles from Montreal, which is now being satistactorily worked, after many vicissitudes, although other inferior clays suitable for the manufacture of pottery occur in Southern Saskatchewan. The D'Amherst deposit is about 1,000 feet wide, and is known to extend North and South for a distance of 7,000 feet. Much of it is stained with iron, and is consequently only suitable for fire-clay, of which a large quantity is being produced. As regards the deposit of white kaolin, a typical analysis shows its contents to be: 47·50 per cent. silica, 1·06 per cent. iron oxide, 36·98 per cent. alumina, 0·23 per cent. lime, magnesia (trace only), potash 0·19 per cent., soda 0·18 per cent., loss on ignition 14·10 per cent. = 100·24 per cent. It is of a pure white colour, and its iron content is declared by Dr. M. E. Wilson, of the Canadian Geological Survey, to be negligible.

The size of the deposit is such that it may ultimately provide, not only for the needs of Eastern Canada, but leave a margin for a substantial export trade. This particular clay is said to be competing favourably now with some of the Cornish clays.

With Canada and the U.S.A. concentrating on china clay development, not to mention other countries like Malaya, the time would seem to have come for the home producers of china clay to make a combined effort to emphasise the superiority of their product over the best of all other kaolins. At any rate, they have still got the advantage of unlimited supplies near the sea-board, to enable them to compete in the matter of transport.

Industrial Uses of Silica

The notes given below are based on an official report on "Silica in Canada" by Mr. L. Heber Cole, issued by the Canadian Department of Mines.

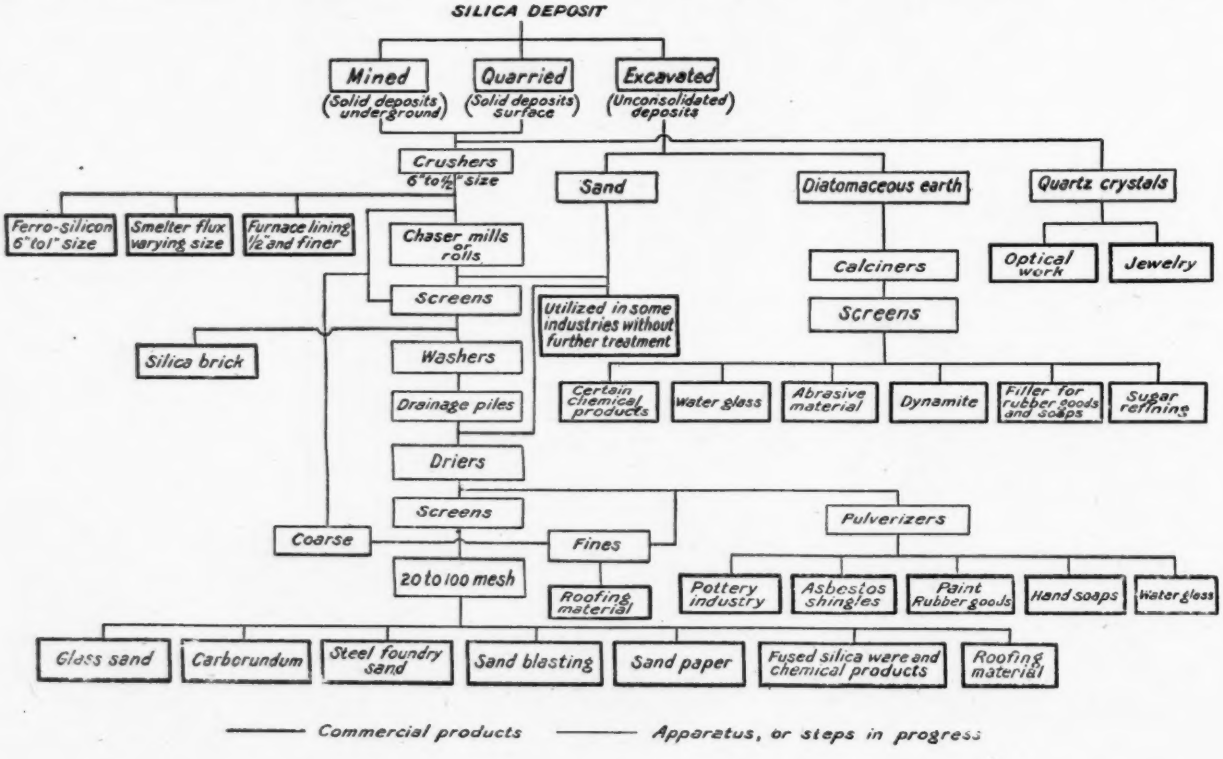
SILICA is one of the most widely distributed compounds in nature and constitutes 59·77 per cent. of the lithosphere. It is found in many forms, crystalline and amorphous, of which quartz is the most important. Quartz is the normal crystalline form and occurs as such in acid igneous rocks and as grains in sands and sandstones, and in quartzites (*i.e.*, sandstones cemented with a siliceous cement). Variations of quartz with more or less impurity constitute several semi-precious stones, amythyst, opal, chalcedony, etc. Flints and diatomaceous earths are colloidal forms of silica, of organic origin, and mixed with more or less impurity.

Industrially silica has many uses, as will be seen on examination of the accompanying chart. Owing to the comparative cheapness of the mineral there is always a tendency to increase the scope of its usefulness. Quartz in the massive crystalline form is known as "rock crystal" and has been used by opticians for spectacle and other lenses for many years. The perfection of different kinds of glass has restricted this use, but it is still employed for ornamental purposes. The uses of the gem varieties are obvious, and large specimens are sometimes very valuable.

The Uses of Lump Silica

Lump silica, obtained from deposits of quartz, quartzite or sandstone, is used in some industries just as it comes from the quarry, while for others it is necessary for it to undergo a preliminary coarse of crushing and screening in order to obtain material of a certain size. When employed in this form its commercial value is very small, and it is only when there is a large demand that it pays to operate a quarry for lump silica alone.

Ferro-silicon is the most extensively used of the ferro-alloys produced in the electric furnace. It is made either by the reduction of silica and iron ore with carbon, or by the reduction of silica with carbon, the iron content being obtained by the addition of iron filings. For this purpose the silica required should be obtained from a pure grade or quartzite, with 97 to 98·25 per cent. silica. The iron oxide content does not greatly matter, except that it should be uniform. Calcium, phos-



phorus an darsenic are very objectionable and may render the product useless.

Silica as a Metallurgical Flux

Silica is used as a flux in metallurgical operations where the ore is basic, as in the extraction of copper. In the smelting of pyrites silica is used to form a siliceous slag with the iron oxide formed. For this purpose a silicate should not be used but free silica is required in the form of quartz, quartzite or sandstone, so that an acid is at once available to combine with the basic iron oxide as soon as it is formed. In the manufacture of phosphorous a 99 per cent. silica is required, which is usually obtained from a pegmatite dyke associated with feldspar. Quartz or quartzite blocks are used in the chemical industry as fillers for acid towers, etc., and rounded flint or quartzite pebbles are used in ball grinding mills.

The Uses of Silica Sand

Silica, in the form of sand, is an essential raw material in many industries. It is used as the raw material for silica bricks which are now used extensively as a refractory material in the metallurgical industries. By far the largest part of the silica brick is manufactured from quartzites, since loose grained rocks—such as sandstones—are of little value for this purpose. One of the most striking differences between silica and clay firebricks is that the former expand when heated, while the latter contract. Hence, silica firebricks are chiefly used where great heat resistance combined with an absence of shrinkage is essential. Some silica rocks, known as gannisters, contain sufficient bond, in the form of highly refractory clay, to render any addition unnecessary. The bond generally used is lime, about two per cent. being added to the crushed quartzite in the form of milk of lime.

The chemical requirements of a siliceous material suitable for a refractory brick vary; but the silica content should be as high as possible. A reliable chemical analysis is of very great importance, since the refractoriness of the finished brick will depend on the silica content, and on the presence of such impurities as lime, alkalies, and iron, which tend to act as fluxes, and lower the melting point of the bricks.

Silica for the Glass Industry

The silica used in the glass industry is generally in the form of sand. The greater part of the material used is obtained from natural sand deposits, or by crushing a friable or loosely bonded sandstone. It rarely pays to crush vein quartz or quartzite for glass manufacture, since the hardness of such materials greatly increases the cost of crushing, and there is also the danger of contaminating the sand with iron particles from the crushers. Glass makers require that the sand should run as high in silica as possible. Objectionable impurities are metallic iron and compounds of iron, alumina, magnesia, lime, and alkalies. Iron oxide is the worst of the impurities found in glass sand, on account of its strong colouring power. The smallest percentage present in the sand tends to impart to the glass a green, yellow, or red colour, the intensity of which depends on the amount of iron oxide present.

For use in carborundum manufacture the silica must be a sand of fairly uniform texture, and graded between the 20 and 100 mesh screens. The sand should test 99·5 per cent. SiO_2, and must not be lower than 99·25 per cent. While it is stated that alumina in small quantities is not injurious, lime, phosphorus, and magnesia should be entirely absent.

Silica finds one of its largest markets in steel foundries; in this industry it is used in the form of sand for making moulds for steel castings. Some sands are found in nature suitable for this purpose, but the greater number of castings are made in moulds consisting largely of a high silica sand, to which some artificial bonding material has been added. This bonding material consists of highly plastic fireclay, flour, molasses or other suitable material. A sand suitable for use in steel casting must have three essential properties—namely, good bonding power, high permeability, and great refractory power.

Uses in Pottery and Paint Manufacture

Crushed quartz or quartzite is the purest form of silica and is used in the manufacture of heat resisting silica ware, and very largely in the pottery industry. The various kinds of pottery in which silica is used are table ware, sanitary ware, electrical porcelain, chemical porcelain, and white floor and wall tiles. About 35 per cent. of finely-ground quartz is used in the composition of the bodies from which these wares are made, the remainder of the body being clay and feldspar. It is necessary to have a silica that will burn to a dead white heat. Hence a high grade material, free from iron, if possible, is desirable. The iron content should not exceed 0·32 per cent.

The introduction of silica into paint manufacture dates back many years, and the modern floated silica is now classed as a standard pigment. Pure silica, in the form of an impalpable powder, is one of the most stable pigments known, being highly refractory, and practically insoluble in water and all acids except hydrofluoric. The silica is said to allow the moisture to pass through the pores of the paint film, and at the same time is impervious to external dampness. For paint purposes, silica with a tooth is preferred, and, as a rule, clear, glassy quartz will yield a sharper grain than opaque massive varieties, no matter how fine the silica may be ground. The material should be well over 95 per cent. SiO_2, and free from iron or other colouring impurities.

For the manufacture of sodium silicate the silica is preferred in the form of a pure diatomaceous earth, or as a finely powdered flint, quartz, etc., and should be as pure as possible.

Numerous uses of silica in the powdered form are found in many industrial processes. It is used extensively as a filler and scouring substance in hand soaps, for dusting moulds in foundries, in roofing papers to keep the rolled sheets of tar paper from sticking, in dental work as a detergent, in numerous chemical operations, and as a filler in paper and rubber goods. It also enters into the composition of match heads, and is used as an abrasive for polishing pearl and bone buttons, and for the making of metal polishes.

Occurrence in Canada

Silica occurs in Canada in wide range of geological strata in the form of quartz, quartzites, sandstones, diatomaceous earths, etc. The sandstone beds of the Sylvania sandstone (of the Lower Devonian age) are stated in the report to be sufficiently near the surface in parts of Ontario to permit of being mined profitably for the production of fine glass sand, while the Potsdam formation of the Cambrian age appears to be the most promising formation as a source of high-grade silica sand. Extensive areas underlain by this formation are to be found in both Ontario and Quebec. The greater part is comprised of rounded grains of quartz, rarely larger than would pass through a 3-mesh screen with generally a siliceous cementing material, though this is sometimes ferruginous, calcareous or arenaceous in places. The beds are generally flat-lying and in some localities are of considerable thickness. Apart from these deposits there are numerous others distributed, through the Dominion and these are, of course, more than sufficient to meet the possible future needs of Canada.

Retaining Overseas Markets

In a recent letter to *The Times* it was pointed out that foreign manufacturers are casting envious eyes at the Indian market. As an example of the determination of their methods, the German manufacturers, denied admittance to the advertising columns of the British-owned Indian Press, have instituted a commercial journal of their own, printed in English and distributed in India, for the express purpose of advertising German goods. Concurrently with this, many British firms are cutting down their Indian advertising or stopping it altogether, although the cost of publicity in India is almost negligible. This timid policy is exactly what the foreign manufacturer would pray for. It is his one chance of ousting us from the greatest overseas market we possess and the one with the most enormous possibilities of development.

British goods enjoy tremendous prestige in India, and the direct object of this foreign advertising is to undermine that prestige. Indian buyers will continue to buy British goods without respect to political situations, but not if the British manufacturer at the first breath of opposition lays down his arms without a struggle.

Chemical Trade in Czecho-Slovakia

The *Prager Presse* writes: One of the youngest branches of Czecho-Slovak industry is the chemical trade. Until comparatively recently Czecho-Slovakia got her supplies almost exclusively from Germany, but of late, ever-increasing efforts have been made to create an independent chemical industry in Czecho-Slovakia. The Aussig Chemical Union, for example, is turning out alizarine dyes, various azo dyes and others, which have proved a success. Experiments are now in progress for producing synthetic indigo, a good basis for which is provided by the Ostrava coal tar production.

From Week to Week

SEVENTY THOUSAND quintals of Chile nitrate were destroyed by fire at Antofagasta on Saturday, September 22.

ALCOHOL PRICES have been advanced two cents per gallon by the United States Industrial Alcohol Co. Other manufacturers are expected to follow suit.

MR. R. B. PILCHER, Registrar of the Institute of Chemistry, spoke from the London Broadcasting Station on Thursday on the subject of "How to become a Chemist."

ALTHOUGH no authentic information is available about the destruction of stocks of menthol in Japan, the market price in Britain has more than doubled during the past few days.

THE FACT that the French authorities are asking full prices for the dyestuffs recently taken over from firms in the occupied area is considered to be indicative of an improvement in trade.

THE PLAN to extend the Manchester College of Technology is again to be laid before the Board of Education. The new building will provide room for further research work in industrial chemistry.

IT IS ANNOUNCED that German dyestuff exports increased very slightly, while miscellaneous chemical and pharmaceutical products decreased by 17 per cent. during the first five months of French occupation of the Ruhr.

JAPAN has suspended the import duties on a number of commodities, until the end of March next. These include oils and certain acids and chemicals, Portland and Roman cements, plate and sheet glass, etc.

SIR ARCHIBALD GARROD, Regius Professor of Medicine, University of Oxford, has been appointed to fill the vacancy caused by the retirement of Professor F. Gowland Hopkins from the Medical Research Council.

A SATISFACTORY EXPERIMENT is being made at the foundry of Denning and Co., Chard, Somerset, in the continuation of "summer time" until October 7. This course was agreed upon almost unanimously by the workers.

AN EXTENSIVE BED of gypsum has been discovered in Ontario, and analysis shows that it is 99·3 per cent. pure throughout. It is stated that the Canadian Government will give all facilities for the exploitation of the material.

TWO OF THE DIRECTORS of the Badische Anilin and Soda Fabrik have been sentenced to six years' imprisonment and a fine of 150 million marks, for having refused to assist in the removal of stocks of dyestuffs and fertilisers seized by the Occupation authorities.

THE OFFICIAL STATISTICS on the output of British sulphuric acid for the first half of this year show that the fertiliser industry is responsible for the consumption of the major portion The superphosphate and sulphate of ammonia industries account for more than half of the total production.

A FEATURE of the National Gas Exhibition at Bingley Hall, Birmingham, which has attracted a large amount of interest, technical and general, has been the reading of papers of scientific interest on popular lines by competent authorities.

LOW TEMPERATURE CARBONISATION, LTD., report that an order has been received through Messrs. Takata and Co., of Tokio, on behalf of the Japanese Government, for a smokeless fuel plant for the manufacture of "Coalite" and by-products of coal.

AFTER nearly a century's investigation, an old limestone quarry has been reopened at Mynydd Mawr, Aberaron, South Carnarvonshire. Some thousands of tons of limestone which, it is stated, analysis shows to be the finest and purest in the United Kingdom, have been quarried.

OWING to great public demand, a limited number of copies of the paper on "Industrial Oxygen," read by Mr. T. Campbell Finlayson (Associate-Member), B.Sc., before the Institution of Chemical Engineers in June last have been published and are issued to the public at the price of 10s. 6d. each.

ONE OF THE CHEMISTS of Kodak Ltd. was responsible for the design of an ingenious portable screen for use in connection with the new Ciné-Kodak home cinema outfit, now being demonstrated at the Royal Photographic Society's Exhibition in Russell Square. It is interesting to note that the design selected was preferred to any submitted by the firm's drawing office.

A MEETING of merchants in the cotton trade, held in Manchester on Tuesday, unanimously declined to accept the proposal by the Piece Dyers' Association to offer customers a rebate of 10 per cent. conditional upon those taking advantage of it signing an undertaking to place all orders with members of the Association. It would prevent, it was said, goods being sent to be dyed and finished more cheaply in foreign countries.

THE DISINFECTANTS exhibited by the South Staffordshire Mond Gas Co. at the National Gas Exhibition were inadvertently described in our issue last week as based on carbolic and cresylic acid and their homologues, whereas they are actually free from any of these compounds, and are therefore non-corrosive and non-poisonous. In addition the disinfectants are of very much greater germicidal power than carbolic acid preparations.

A HUNDRED WORKPEOPLE in the employ of Joseph Hoyle and Sons, Ltd., Longwood, are on strike. They are demanding that five men who have been dismissed should be reinstated. The men's secretary has asked that the men should be reinstated, but the firm refuse to consider the matter until the men on strike return to work. It is pointed out that they left work without notice, and therefore the strike is illegal. The strikers are picketing the works.

A PROGRAMME OF MEETINGS until the end of the year has been arranged by the Manchester Section of the Institute of Chemistry, which includes papers by Professor Treadwell of Zurich on "Electrometric Methods in Analytical Chemistry" at a joint meeting with the Society of Chemical Industry, the Society of Dyers and Colourists, and the Manchester Literary and Philosophic Society, and by Mr. F. E. Hamer (THE CHEMICAL AGE) on "The Chemist in Relation to Public Life."

THE METRIC SYSTEM has been dropped by the U.S. Public Health service from its specifications covering the purchase of drugs, etc., thus following the lead of the Medical Department of the Army. The General Supply Committee have fallen into line. Elimination of the metric system from Government specifications is declared by those interested to be in accord with commercial practice and in line with the policy of the Commerce Department to bring about simplification of practices, waste elimination, standardisation and economies in industries.

THE OCCUPATION OF THE RUHR has not had the effect upon the British dyestuffs industry which some had anticipated. Certain German works have been working at full pressure, with the result that the output is considerably above the normal, and have added to stocks outside the reach of the occupying authorities. This has enabled the Germans to maintain their connections with overseas buyers. In spite of this, it is pleasing to be able to state that a renewed demand for British-made indigo has arisen in China, and, to a smaller extent, a demand for vat colours of the indanthrene type from India.

DEPOSITS of limonite, a mineral substance, used in the manufacture of paint, linoleum, tiles, and for glazing, are reported to have been found at Penderyn, in South Brecon. At present, supplies come from America. Traces of limonite have been previously noted on the farm lands of Aberilla, Penderyn. The property belongs to Dr. Vaughan Griffith, medical officer of health, Wrexham, and he called in a mining expert, from whose investigations it appears that a seam of limonite 20 in. thick has been located, and that a second seam was also found at an increased depth. The discoveries are considered to be of importance, and so far are deemed to be encouraging.

AT THE ORDINARY Scientific Meeting of the Chemical Society on Thursday, October 4, papers will be read on "A Revision of the Dissociation Constants of Weak Inorganic Acids. Part I.—Boric Acid." and "Part II.—Phosphoric Acid," by Messrs. E. B. R. Prideaux and A. T. Ward; "Two Heterogeneous Gas Reactions," "A Homogeneous Gas Reaction (the thermal decomposition of chlorine monoxide, Part I)," by Messrs. C. N. Rinshelwood and C. R. Prichard; "The Direct Union of Oxygen and Sulphur," by Messrs. R. G. W. Norrish and E. K. Rideal; "Aqueous Formaldehyde Solution," by Messrs. W. R. Ormandy and E. C. Craven; and "The Interaction of Potassium Tetroxide with Ice and with dilute Sulphuric Acid," by Messrs H. Hawley and H. J. S. Sand.

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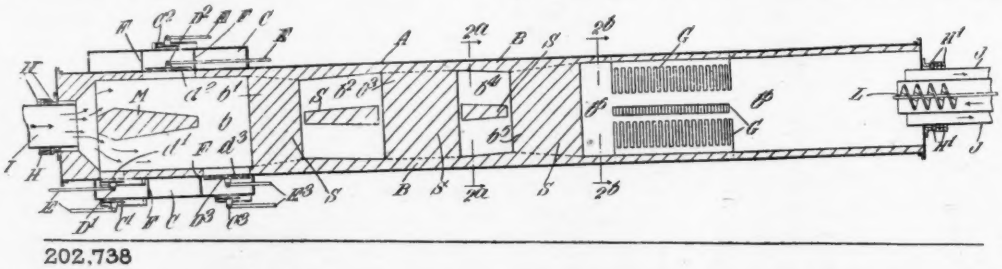
Abstracts of Complete Specifications

202,664. Iron-Chromium Alloys, Manufacture of. W. R. Saltrick, "The Acacias," Higher Drive, Purley, Surrey. Application dates, February 23 and October 23, 1922.

The object is to produce iron-chromium alloys containing 9–16 per cent. of chromium and less than 0·4 per cent. of carbon, by the direct use of molten steel or alloy steel or iron, the re-agents being such that any impurities thus introduced into the steel may be readily removed without oxidation of the chromium. An ore or compound of chromium and a reducing agent containing silicon are added to the molten metal in a furnace, which may be an electric furnace of the arc or induction type. As an example, a mixture added to the molten metal may consist of ground chromite, fluxes such as lime and/or fluorspar, and ferro-silicon, calcium silicide, or other silicon alloy reducing agent substantially free from carbon. The resulting alloy has a low carbon content and may be freed from any excess of silicon by oxidation by a blowing operation, without any substantial oxidation of the chromium. A more energetic reduction of the chromite may be obtained by adding aluminium, ferro-calcium, calcium-silicon-aluminium alloy, or other similar reducing agent. To avoid the large bulk of ore and reducing agent, and the large quantity of slag produced, a proportion of a chromium alloy may be added to the molten steel in the form of ferro-chrome or iron-chromium-silicon alloy. The ore and reducing agent added are preferably briquetted with a little neutral sodium silicate.

202,667. Ores, Reduction of. Sir E. P. C. Girouard, 1, St. James's Street, London, S.W., and F. W. S. Jones, 14–16, Cockspur Street, London, S.W. Application date, February 28, 1922.

In the reduction of ores, the charge of fuel, flux and ore is subjected to a preliminary coking process at low or moderate temperature, the distillation is arrested when most of the tar has been removed, and the residue contains a substantial proportion of volatile hydrocarbon. The ore is also partly reduced to the metal. As applied to the reduction of iron ore, the ore is finely ground in a ball mill and then concentrated by removal of the gangue. The limestone or other flux, and the coking or binding coal which is employed as a fuel, are also finely ground before mixing with the ore. The mixture is then coked or carbonised at a temperature rising from 350° C. to 800° C. at the later stages. The coked residue may be passed directly to the reduction furnace to avoid loss of heat. The character of the fuel used is such that a hard coke is produced by suitable regulation of the temperature. The whole of the fuel for complete reduction may not be mixed with the charge, but may be added with the air blast in powdered form. In this process the fuel remaining after the preliminary distillation contains a substantial proportion of volatile hydrocarbons and has a higher calorific value than the usual metallurgical coke.



202,738

202,678. New Sodium Compound and Composition containing the same, Process and Manufacture of. H. E. Cocksedge, Milford, Hartford, Cheshire. Application dates, April 22 and July 27, 1922.

It has been found that when sodium bicarbonate is heated to a temperature insufficient to convert it into sodium carbonate or sesquicarbonate, a new carbonate is produced, having the formula $Na_2CO_3 . 3NaHCO_3$. This compound crystallises in fine needles, and is distinguishable from sodium carbonate, bicarbonate and sesquicarbonate by its refractive indices, 1·435 and 1·526. If the crude bicarbonate is heated to 98° C., it is fully converted into the new compound in 1½ hours, while at 95° C. the conversion takes six hours, and at 90° C. only 50 per cent. conversion is obtained in 11 hours. The bicarbonate should contain some water, *e.g.*, the crude bicarbonate from the ammonia-soda process containing 12–15 per cent. of water is suitable. This compound may be used as an ingredient of washing compounds, or as a detergent, and it may be mixed with other detergents such as soap powder.

202,734. Vat Dyestuffs and their Intermediate Products, Process for Producing. S. Sokal, London. From Kalle and Co., Akt.-Ges., 23, Rheinstrasse, Biebrich-on-Rhine, Germany. Application date, May 25, 1922.

When naphthalene dithioglycollic acids or their derivatives are treated with acid condensing agents, compounds are formed in which two oxythiophene nuclei are combined with the nucleus of the naphthalene. These compounds may be oxidised or coupled with cyclic ortho-diketones or derivatives thereof, especially isatine, diketo-dihydro-thionaphthenes, or the alpha derivatives of these, acenaphthenequinone or their substitution products or naphthisatines, to obtain thio-indigo or indigoid colouring matters. To obtain the naphthalene dithioglycollic acids naphthalene disulphonic acids may be treated with phosphorus pentachloride, and the resulting disulphochlorides are reduced first to the corresponding naphthalene disulphonic acids, then to the disulphides, and then to the naphthalene-dimercaptans. These dimercaptans are then condensed with chloroacetic acid in alkaline solution, yielding the salts of naphthalene dithioglycollic acids. An example is given of the preparation of naphthalene-2:6-dithioglycollic acid, which is soluble with difficulty in organic solvents except nitrobenzene, but soluble in alkali or soda. The sodium salt is insoluble in alcohol, and the calcium salt is soluble with difficulty in water. The naphthalene-2:6-dithioglycollic acid is converted into the corresponding oxythionaphthene by treatment with chlorosulphonic acid. Several examples of the preparation of other naphthalene dithioglycollic acids and derivatives are also given.

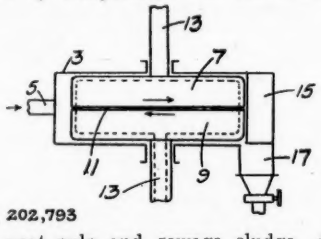
202,738. Distillation or Heat Treatment of Carbonaceous and Other Materials, Process and Apparatus for. H. Nielsen, 13, Firs Avenue, Muswell Hill, London, N.10, and B. Laing, Abdale House, Hatfield, Herts. Application date, May 25, 1922.

A rotary retort for the distillation of carbonaceous material is mounted with its axis slightly inclined to the horizontal, and provided with internal shelves or baffles which are so arranged that different zones are formed, which serve to retard or accelerate the rate of travel of the material through the retort. The retort is heated internally by the sensible heat of producer gas. The retort A is lined with refractory material, and its internal surface is inclined to form successive zones b, b^1—b^6, which are either of cylindrical or truncated conical shape. The rate of travel of solid material in the retort depends on the speed of rotation and of the inclination of the sides to the horizontal, so that the rate of travel in the various zones b— b^6 is variable. The retort may be employed in the distillation of carbonaceous material for the recovery of tar oils at a temperature of 400°—700° C. In this process it is necessary for the maximum recovery of oils to maintain the

material at that temperature for as long a period as possible and then to pass the material through other temperature ranges as quickly as possible consistent with the formation of other products, while the solid residue is raised to a higher temperature to consolidate it—*e.g.*, to produce metallurgical coke. Baffles are arranged diametrically across the retort, and are of wedge or triangular section, and arranged at an angle to one another. By arranging the successive shelves at different angles with respect to one another, and if one shelf has its apex directed towards one end of the retort while the next shelf is inclined in the opposite direction, the passage of the material may be accelerated or retarded as desired. The cooling chamber C is provided with a number of exit doors C^1, C^2, C^3, and the retort communicates with this chamber by doors D^1, D^2, D^3, provided with screens or gratings of different sizes. The smaller gratings are arranged in advance, so that the material is graded in its discharge into the chambers C. Partitions F may be provided to separate the various grades. The plastic material in the zone b^6 of the retort may be broken up by means of short curved ribs G, projecting into the retort. The hot producer gas passes through the retort from the inlet I to the outlet J, and gas-tight joints between the rotating retort and these pipes are maintained by means of piston rings H similar to those used for engine pistons. Excessive coagulation of the carbonaceous material within the retort may be prevented by adding a proportion of partly carbonised material.

202,793. Drying Process or Apparatus. T. Rigby, 72, Victoria Street, Westminster, London. Application date, June 26, 1922.

This drier is of the kind in which a thin film of material is spread on a drying surface—*e.g.*, a drum which is internally heated by means of the evolved vapour, the temperature of which is raised by compression. In the treatment of such



202,793

materials as peat pulp and sewage sludge, difficulties are experienced in spreading the material in a thin uniform film upon the drum. If this is done by coaction with another rotary drum, or by means of a stationary gate co-operating with the drum, the presence of large particles of hard material is liable to cause damage to the drum or to the gate, and thus prevents the formation of a uniform film. To avoid this the pulp may be previously filtered or screened or crushed to a fineness equal to the thickness of the film desired. The illustration shows a suitable screening nevice. The pulp is supplied through a pipe 5 to a casing 3 containing two cup-shaped rotary members 7, 9 driven in opposite directions, and separated at their peripheries by a space sufficiently small to exclude particles larger than the desired thickness of the film. The screened pulp is discharged through the hollow lower shaft 13, and the coarser material is discharged into a well 17. The orifice 11 is kept clear by the relative rotation of the members 7, 9, assisted by a scraper 15. An alternative screening device is described, consisting of a horizontal perforated plate through which the pulp passes while the larger particles are swept from the plate by means of radial arms which rotate over it.

202,795. Extracting Volatile Oils from Coal Gas, Natural Gases or Other Similar Gases, Process of. K. Ikeda, 16, Gochome, Fujimicho, Kojimachi-ky, Tokyo; H. Isobe, 47, Nezu Yayegaki-cho, Hongo-ku, Tokyo; and T. Okazawa, 41, Tabata, Aza, Takinogawa-machi, Kitatoshima-gori, Tokyo Prefecture, Japan. Application date, June 27, 1922.

Volatile constituents of coal gas or natural gas such as benzol, pentane, hexane, naphthalene, etc., are removed by adsorption in acidic clay, such as fuller's earth, Florida earth, etc. The adsorbed oils are liberated by heating, and condensed by cooling. The clay is prepared by kneading with water in the porportion of 80–110 parts of water to 100 parts of dehydrated clay. The clay is then divided into small pieces of large surface area, and dried at 150°–600° C. The clay is contained in a cylinder, and the gas passed through it until the clay is saturated. Steam is then passed through a surrounding jacket to liberate the adsorbed vapour, which passes to a condenser and collector. The removal of the vapour from the clay is facilitated by passing a very slow stream of the gas through it.

202,882. Electrolytic Apparatus. J. P. Scott, 2, Lonsdale Road, Toronto, Canada. Application date, October 24, 1922.

The apparatus is for the electrolysis of water to produce oxygen and hydrogen, and is of the filter press type. The path of the electrolyte circulation is made shorter by effecting a circulation within sub-multiple groups of cells, there being no circulation between such groups. Separate spaces for hydrogen and oxygen are provided in the half-cell compartments, while the anolyte and catholyte are withdrawn separately to chambers in which a further separation of the gas takes place. Each unit comprises 6–12 cells, so that the voltage drop across each unit is small, and shunt currents are largely avoided. A detailed description of the apparatus is given.

Note.—Abstracts of the following specifications, which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: 180,680 (New Jersey Zinc Co.), relating to the manufacture of zinc oxide, see Vol. VII., p. 179; 181,014 (F. Pollak), relating to the manufacture of condensation products from urea or its derivatives and formaldehyde, see Vol. VII., p. 214.

International Specifications not yet Accepted

201,134. Evaporating Liquids. S. M. Lillie, 4,804, Springfield Avenue, Philadelphia, Pa., U.S.A. International Convention date, July 24, 1922.

Liquid is evaporated by distributing it over a nest of horizontal tubes 8, heated by hot gases or by electricity. Vapour

FIG. 1.

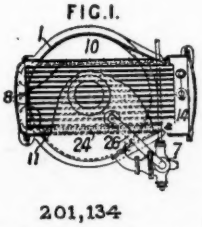
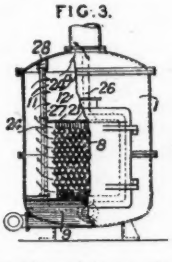


FIG. 3.



201,134

passages 10, 11, are provided at the sides of the casing, and a chamber 12 at the top to separate water from the vapour. Liquid collecting in the base 9 is forced by a pump 7 through pipe 26 on to a perforated distributing plate 21 above the tubes 8. Vertical baffles 24, 24^a in the form of vertical I-bars are arranged between the tubes 8 and the side passages 10, 11.

201,150. Dyes. Farbenfabriken vorm. F. Bayer & Co., Leverkusen, near Cologne, Germany. International Convention date, July 18, 1922.

A diazotized monoacidyl-diaminophenol-alkylether is coupled with 1-naphthylamine-6- or 7-sulphonic acid, or a mixture of these, or 1 : 2-aminonaphthol-alkylether-6-sulphonic acid, rediazotized, and combined with 1-naphthol-3- or 4-sulphonic acid or 2-naphthol-6- or 7-sulphonic acid and the acidyl group split off. New disazo dyes are obtained, which dye cotton in blue shades and may be diazotized on the fibre and coupled with β-naphthol. Examples are given.

201,163. Active Charcoal. Farbwerke vorm. Meister, Lucius and Brüning, Hoechst-on-Main, Germany. International Convention date, July 22, 1922.

Peat or lignite is ground and mixed with sawdust, and the mixture soaked with phosphoric acid solution, compressed into moulds, and carbonised in a revolving kiln. An active charcoal is obtained.

201,510. Cellulose Esters. Soc. de Stéarinerie et Savonnerie de Lyon, 56, Chemin de Gerland, Lyons, France. International Convention date, July 29, 1922.

Cellulose is condensed with an organic acid, or a derivative of such acid, containing more than five atoms of carbon, to obtain the corresponding ester. Such acids include capric

caproic, caprylic, lauric, myristic, palmitic, and stearic acids, or saturated cyclic acids such as naphthenic acids may be used. If an acid chloride is used, an organic base such as pyridine or quinoline is also added; if an acid anhydride is used, a dehydrating agent such as melted zinc chloride is also added. Monoesters, diesters or triesters may be obtained according to the proportions used, and the two latter are soluble in chloroform, carbon tetrachloride, halogen derivatives of acetylene, or benzene, but the monoesters are insoluble. In an example, hydrocellulose is treated with chloroform and pyridine, and palmityl chloride mixed with chloroform is added. The mixture is heated on a water bath and then in an autoclave at 100° C. The product is dissolved in chloroform, and cellulose di-palmitate is then precipitated by adding alcohol.

201,526. CELLULOSE, DEHYDRATING; FABRICS, DYEING. Soc. Industrielle pour l'Application de Brevets et Procédés, 7, Avenue de Paris, Rueil, Seine-et-Oise, France. International Convention date, July 25, 1922.

Films, mercerised cotton, "sulphurised" paper, etc., of hydrated cellulose may be dehydrated by treating in a closed vessel with dry saturated steam. The affinity of the hydrated cellulose for water and dyes is thereby reduced, and this may be made use of in dyeing fabrics of mercerised and unmercerised cotton.

201,528. BARIUM AND STRONTIUM SALTS. Rhenania Verein Chemischer Fabriken Akt.-Ges., Aachen, Germany. International Convention date, July 31, 1922.

Residues from the extraction of barium and strontium sulphides from the reduced sulphates are treated with calcium magnesium or ferrous chloride or nitrate. The remaining barium or strontium is thus extracted as chloride or nitrate, and is crystallised from the solution.

201,531. VULCANISING FATS, ETC. J. H. van der Meulen, 16, Nieuwe Kade, Arnhem, Holland. International Convention date, July 31, 1922.

Fats, and drying, non-drying or semi-drying oils such as rape oil, almond oil, olive oil, linseed oil, castor oil or codliver oil, fatty acids, sulphurised oils, and polymerised oils may be vulcanised by exposure to sulphur chloride vapour. The process is applicable for treating leather and other goods by coating them with the oil, and then vulcanising it as above. The layer of oil may first be covered with a layer of rubber, and the two vulcanised simultaneously. The elasticity, etc., of the layer may be modified by adding diluents such as carbon tetrachloride, turpentine oil, resins, gums, etc.

201,540. DYES. Soc. of Chemical Industry in Basle, Basle, Switzerland. International Convention date, July 28, 1922.

An indophenol from a monoalkyl-α-naphthylamine, such as ethyl-α-naphthylamine, and *p*-aminophenol are treated with a salt of sulphurous acid such as sodium bisulphite to obtain monosulphonic acids of 1-monoalkylamino-4-*p*-oxyarylnaphthylamines. If these sulphonic acids are heated with a polysulphide and copper sulphate, dyes are obtained which dye cotton green.

201,555. DESULPHURISING IRON, FERRO-ALLOYS, ETC. Chemical Treatment Co., New York. (Assignees of D. D. Jackson, 930, President Street, Brooklyn, New York; J. D. Sears, 425, Franklin Street, Bloomfield, N.J., U.S.A.; and F. Conlin, 509, Colonial Avenue, Westfield, N.J., U.S.A.) International Convention date, July 29, 1922.

Molten iron, steel, or ferro-alloy is treated with a mixture of caustic soda 30 per cent. and sodium carbonate 70 per cent. to desulphurise it.

201,570. VULCANISING INDIARUBBER. D. J. Chatelan, 12, Terreaux, Lausanne, Switzerland. International Convention date, July 28, 1922.

Cyanamide or dicyandiamide is used as a vulcanisation accelerator. If equal proportions of sulphur and dicyandiamide are used, the time of vulcanisation is reduced to one-half.

LATEST NOTIFICATIONS.

204,046. Centrifugal separators. Aktiebolaget Separator. September 12, 1922.

204,047. Centrifugal separators. Aktiebolaget Separator. September 13, 1922.

204,063. Production of carbon dioxide from waste gases and the like. Ketterer, E. September 16, 1922.

Specifications Accepted, with Date of Application

186,329. Distilling apparatus for continuous operation. P. Parodi. September 21, 1921.

189,146. Plastic composition. Elektrizitätswerk Lonza. November 18, 1921.

189,419. Artificial manures, Manufacture of. J. Gradl. November 22, 1921. Addition to 184,800.

190,099. Rubber latex and similar material, Process and apparatus for treating. General Rubber Co. December 7, 1921.

194,278. Waste liquids, Treatment and purification of. F. Westen. February 28, 1922.

203,352. Titanic acid, Production of. C. Weizmann and J. Blumenfeld. March 1, 1922.

203,354. Purifying oils and the like, Process for. H. M. Ridge and W. R. Hodgkinson. March 4, 1922.

203,357. Iron-chromium alloys, Production of. W. R. Saltrick. March 7, 1922.

203,383. Copper oxide, Production of refined copper from. W. G. Perkins and W. H. Beasley. June 2, 1922.

203,497. Base-exchanging compounds, Process of regenerating—after use. T. P. Hilditch, H. J. Wheaton, and J. Crosfield and Sons, Ltd. August 14, 1922.

203,506. Distilling and fractionating column. A. L. Bloomfield and A. Boake, Roberts and Co., Ltd. August 22, 1922.

203,519. White oxide of antimony, Process of manufacture of. A. Germot. September 8, 1922.

203,533. Dyestuffs and intermediate products therefor, Manufacture and production of. J. Y. Johnson. (*Badische Anilin und Soda Fabrik.*) September 19, 1922.

203,551. Nitrate of lime. R. B. Hovey and E. L. Hovey. October 5, 1922.

203,576. Gyratory crushers. W. S. Weston. November 7, 1922.

203,599. Acetose, *i.e.*, acetylated cellulose and products derived therefrom, such as artificial silk, horsehair, films, and the like, Process for the manufacture of. J. C. Zdanowich. April 5, 1922.

203,608. N-mono- and dicarboxylic acid esters of asymmetrically-substituted alkylenediamines. O. Y. Imray. (*Soc. of Chemical Industry in Basle.*) December 30, 1922.

203,632. Rotary pulverisers. A. Squassi. March 24, 1923.

Applications for Patents

Badische Anilin- and Soda-Fabrik, and Johnson, J. Y. Manufacture of active carbon. 23,231. September 17.

Badische Anilin- and Soda-Fabrik, and Johnson, J. Y. Manufacture of fuel gas. 23,232. September 17.

Badische Anilin- and Soda-Fabrik, and Johnson, J. Y. Production of vat colouring-matters. 23,348, 23,349. September 18.

Bhopal Produce Trust, Ltd., Fraymouth, W. A., and Wade, H. Recovery of calcium oxalate, etc., from trees. 23,565. September 20.

British Cellulose and Chemical Manufacturing Co., Ltd. Production of yarns or threads. 23,423. September 19.

Casale, L. Production of catalysts for synthesis of ammonia. 23,557. September 20.

Casale, L. Apparatus for catalytic production of synthetic ammonia. 23,570. September 20.

Charpentier, M., and Henneberg, G. Manufacture of fuel alcohol. 23,672. September 21. (France, March 27.)

Dreyfus, H. Manufacture of aliphatic compounds. 23,424. September 19.

Hopol, Ltd. Manufacture of soap. 23,675. September 21.

Lomax, E. L., Lucas, O. D., and U. V. Oil Processes, Ltd. Methods of distilling heavy hydrocarbons. 23,514. September 20.

Plauson's (Parent Co.), Ltd., and Plauson, H. Insecticides, etc. 23,394. September 19.

Price, G. B., and Quirk, Barton and Co., Ltd. Production of lead oxide. 23,229. September 17.

Schaar, E. G. Björnsen-. Manufacture of benzole products and coke. 23,264. September 17.

Recent Wills

Major J. P. Paull, of Perranorworthal, Cornwall, a director of the Truro Colour Co..... £27,701

Sir Robert Park Lyle, of Eaton Place, London, S.W., chairman of Tate and Lyle, Ltd., sugar refiners £700,628

Alderman Adam Logan, cement merchant, of Berwick-on-Tweed, ex-Mayor of Berwick (net personalty £5,595) £8,043

Mr. Frederick Barber Frost, paint and colour merchant, of Clifton Street, Old Trafford, Manchester (net personalty £14,036) £15,145

Mr. Robert Girvin, chairman of Robert Girvin and Co., tinplate and metal merchants, of 24, St. Mary Axe, and a director of the Newquay China Clay Co., who died on May 10, aged 71 years (net personalty £71,933)..... £76,501

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

London, September 27, 1923.

MARKETS generally during the past week have shown perhaps a rather brighter tendency. Industrial districts are taking a little interest in one or two lines. There is reason to hope that the improvement shown will be progressive.

The export market is without special feature.

General Chemicals

ACETONE is practically unobtainable for prompt delivery; a further advance in price is expected.

ACID ACETIC remains a firm market—the turnover has improved.

ACID CITRIC.—The market is stagnant.

ACID OXALIC.—Unchanged and in moderate demand.

ACID TARTARIC is lower in price and slow of demand.

BARIUM CHLORIDE.—Without special feature.

CREAM OF TARTAR is quiet and price is inclined to sag.

FORMALDEHYDE is scarce for prompt delivery and spot supplies command a premium. The forward situation is unchanged.

LEAD ACETATE has advanced in price and is in fair demand.

POTASSIUM CARBONATE is slow of sale. Price tendency is in buyers' favour.

POTASSIUM PRUSSIATE.—A weak market, with little doing.

SODA ACETATE is much firmer in price, due to the improvement in Reparation exchanges.

SODIUM PRUSSIATE is very quiet, but price seems to have touched bottom.

SODIUM SULPHIDE is unchanged.

ZINC SALTS is unchanged.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID is in good request—price well maintained.

ACETANILID is firm and in demand for export.

ACID LACTIC.—Higher prices are asked by the leading importers.

AMIDOPYRIN has been in request for October delivery.

BARBITONE is slightly easier on a slow market.

BROMIDES.—Leading Continental makers are quoting prices well in advance of those ruling in this market.

EUCALYPTUS OIL.—Higher prices are well maintained.

GUAIACOL CARBONATE is firm and in demand for export.

METHYL SALICYLATE.—Stocks are low and higher prices are likely.

PHENAZONE is very firm. Export demand has been large and orders for October delivery are difficult to execute.

SODA SALICYLATE.—The leading manufacturers are busy and have sold their production well ahead.

SODA BENZOATE.—German makers have advanced their quotations. Business is, however, on a comparatively small scale.

THEOBROMINE is in good request.

VANILLIN is unchanged.

Coal Tar Intermediates

This section continues gradually to expand, and as export demand picks up, some increases in price are to be expected.

ALPHA NAPHTHOL continues firm and export demand is good.

ALPHA NAPHTHYLAMINE is steady with export inquiries in the market.

ANILINE OIL.—Business has been booked on home and export account.

BENZIDINE BASE.—Some home orders are reported and the price is unchanged, while export buyers are slightly interested.

BETA NAPHTHOL continues to pass into consumption.

DIMETHYLANILINE is without special feature.

DIPHENYLAMINE is firm.

"H" ACID is steady.

NITRO BENZOL has been of more interest on export account.

PARANITRANILINE is steady and firm.

RESORCINE is quiet.

Coal Tar Products

The market generally remains quietly steady.

90% BENZOL.—Owing to the drop in the price of petrol, sellers are rather easier, and to-day's value is 1s. 3d. to 1s. 3½d. per gallon on rails.

PURE BENZOL is still slow of sale at 1s. 6d. to 1s. 7d. per gallon on rails.

CREOSOTE OIL.—Sellers are firm at 8¼d. to 8½d. per gallon on rails in the North, and at 9¼d. to 9½d. per gallon in the South.

CRESYLIC ACID.—There is rather more inquiry, and prices are well maintained. The pale quality 97/99% is worth 1s. 10d. to 2s. per gallon on rails, while the dark quality 95/97% is quoted at 1s. 7d. to 1s. 8d. per gallon.

SOLVENT NAPHTHA is somewhat depressed, and there are sellers at 1s. 1d., and possibly 1s. per gallon on rails.

HEAVY NAPHTHA remains in very slow demand at 1s. 2d. to 1s. 3d. per gallon on rails.

NAPHTHALENE.—There is rather more inquiry, and the higher qualities have improved in price. To-day's quotations are £6 to £6 10s. per ton for Crude Drained, £7 10s. to £8 for 74/76, and £8 10s. to £9 for 76/78.

PITCH.—There is some improvement in the demand, but prices remain without much change. To-day's value is 122s. 6d. to 125s., f.o.b., East Coast, and 125s. to 127s. 6d., f.o.b. London.

Sulphate of Ammonia

There is no change in the position.

[Current Market Prices on following pages.]

Viscose Silk Cellulose

PROFESSOR F. S. KIPPING, in one of his addresses at the Nottingham University College on cellulose products, stated that in the manufacture of viscose silk cellulose, obtained from spruce wood, was bleached and mixed with caustic soda, when it gave a solid product which contained cellulose and caustic soda. This alkali cellulose was stirred with liquid carbon bisulphide, the product being viscose. Viscose could be made into threads in a similar manner to that used in the manufacture of cuprammonium silk, and the threads then produced were highly lustrous and were known as viscose silk. This substance was not only of great importance for the manufacture of viscose silk, but also for the manufacture of a hundred other things. It had all the uses of celluloid, or xylonite, because it could be transformed into colourless, transparent, or coloured products; and the substance had not the one disadvantage of xylonite in that it was not highly combustible. Most of the artificial silks depended upon the conversion of cellulose into some form from which the cellulose could be regenerated. Cellulose acetate was, however, used as such. It could be made into all sorts of fancy articles, just as could xylonite and viscoid.

Chemical Problems with Motor Radiators

IN motor radiators both rust and lime deposits detract from the cooling efficiency, and cause undue consumption of petrol and oil. The problem to be tackled is a big one. Experiments tend to show that methods for the minimising of lime deposits may increase corrosion of the metal. Moreover, the corrosive action of water is nearly ten times as great at boiling point as at freezing point. Again, certain experiments have shown the corrosive action of water, when moving at a velocity of only 540 ft. per hour, to be nearly 2½ times greater than when the water is at rest; yet, when the velocity of flow was increased to 30,000 ft. per hour (i.e., less than six miles per hour) it was only half as rapid as with the water at rest.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	127	10	0	to	130	0	0
Acid, Acetic, glacial, 99–100%	ton	73	0	0	to	74	0	0
Acetic, 80% pure	ton	49	0	0	to	50	0	0
Acetic, 40% pure	ton	25	0	0	to	26	0	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	1	1½	to	0	1	2½
Citric	lb.	0	1	5	to	0	1	5½
Formic, 80%	ton	50	0	0	to	51	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	39	0	0	to	40	0	0
Lactic, 60 vol.	ton	44	0	0	to	46	0	0
Nitric, 80 Tw.	ton	26	0	0	to	27	0	0
Oxalic	lb.	0	0	6½	to	0	0	6½
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	1½	to	0	1	2
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	8	10	0	to	9	0	0
Sulphate, 17–18%	ton	10	10	0	to	11	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	32	15	0		—		
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	35	0	0	to	37	10	0
Nitrate (pure)	ton	35	0	0	to	40	0	0
Phosphate	ton	65	0	0	to	68	0	0
Sulphocyanide, commercial 90%	lb.	0	1	1	to	0	1	3
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	70	0	0	to	72	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	15	10	0	to	16	0	0
Nitrate	ton	33	0	0	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	7	6	to	10	17	6
Borax crystals, commercial	ton	25	0	0	to	—		
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	22	0	0	to	23	0	0
Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	100	0	0	to	105	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	26	0	0	to	27	0	0
Cream Tartar, 98–100%	ton	86	0	0	to	88	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	73	0	0	to	74	0	0
Formusol (Rongalite)	lb.	0	2	1	to	0	2	2
Glauber salts, commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols	gal	0	2	0	to	0	2	1
Iron perchloride	ton	18	0	0	to	20	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	41	0	0	to	42	0	0
Carbonate (White Lead)	ton	43	0	0	to	45	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	37	0	0	to	39	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	3	10	0	to	3	15	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	8	0	0	to	9	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	50	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate, double salt	ton	37	0	0	to	38	0	0
Potash, Caustic	ton	30	0	0	to	32	0	0
Potassium bichromate	lb.	0	0	5½	to	0	0	6
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to	—		
Metabisulphite, 50–52%	ton	65	0	0	to	70	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	10	to	0	0	10½
Prussiate, red	lb.	0	3	0	to	0	3	2
Prussiate, yellow	lb.	0	1	0	to	0	1	1
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	3	3	0	to	—		
Seconds	cwt.	3	0	0	to	—		
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	0	0	4½
Bisulphite, 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3	to	0	0	3½
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	5	to	0	1	6
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	27	10	0	to	28	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	1	0	to	0	1	1
Prussiate	lb.	0	0	6	to	0	0	6½
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62 %	ton	14	10	0	to	15	10	0
Sulphite, cryst.	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	0	11½	to	0	1	0
Tin perchloride, 33%	lb.	0	1	1	to	0	1	2
Perchloride, solid	lb.	0	1	3	to	0	1	4
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	15	0	0	to	16	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	0	to	0	3	3
Acetanilid	lb.	0	1	6	to	0	1	9
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	6	to	0	2	9
Salicylic, B.P.	lb.	0	2	1	to	0	2	3
Tannic, leviss	lb.	0	3	2	to	0	3	4
Amidol	lb.	0	7	9	to	0	8	3
Amidopyrin	lb.	0	12	0	to	0	12	6
Ammon ichthosulphonate	lb	0	1	10	to	0	2	0
Barbitone	lb.	0	17	6	to	0	18	6
Beta naphthol resublimed	lb.	0	1	9	to	0	2	0
Bromide of ammonia	lb.	0	0	7	to	0	0	7½
Potash	lb.	0	0	6	to	0	0	6½
Soda	lb.	0	0	7	to	0	0	7½
Caffeine, pure	lb.	0	10	9	to	0	11	0
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	9	to	0	2	0
Calomel	lb.	0	3	9	to	0	4	0
Chloral hydrate	lb.	0	4	0	to	0	4	3
Cocaine alkaloid	oz.	0	19	6	to	1	0	0
Hydrochloride	oz.	0	16	9	to	0	17	3
Corrosive sublimate	lb.	0	3	3	to	0	3	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	2	6	to	0	2	8
B.P. (75–80% eucalyptol)	lb.	0	2	7	to	0	2	9
Guaiacol carbonate	lb.	0	8	6	to	0	8	9
Liquid	lb.	0	8	9	to	0	9	3
Pure crystals	lb.	0	9	3	to	0	9	9
Hexamine	lb.	0	3	8	to	0	3	10
Hydroquinone	lb.	0	3	6	to	0	4	0
Lanoline anhydrous	lb.	0	0	7	to	0	0	7½
Lecithin ex ovo	lb.	0	17	6	to	0	19	0
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	6	to	0	3	0
Metol	lb.	0	9	0	to	0	10	0
Milk sugar	cwt.	4	2	6	to	4	5	0
Paraldehyde	lb.	0	1	5	to	0	1	6
Phenacetin	lb.	0	6	0	to	0	6	3
Phenazone	lb.	0	7	6	to	0	7	9
Phenolphthalein	lb.	0	6	9	to	0	7	0
Potassium sulpho guaiacolate	lb.	0	5	0	to	0	5	3
Quinine sulphate, B.P.	oz.	0	2	3	to	—		

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	6	to	0	5	9
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	6	to	0	2	8
Salol	lb.	0	3	0	to	0	3	3
Soda Benzoate	lb.	0	2	4	to	0	2	6
Sulphonal	lb.	0	14	0	to	0	14	6
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	11	0	to	0	11	6
Soda salicylate	lb.	0	8	6	to	0	9	0
Vanillin	lb.	1	3	0	to	1	4	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	0	to	0	2	3
Refined	lb.	0	2	6	to	0	2	9
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	9	to	0	0	9½
Salts	lb.	0	0	9½	to	0	0	10
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	6	to	0	2	9
Benzidine, base	lb.	0	4	9	to	0	5	0
Sulphate	lb.	0	3	9	to	0	4	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	4	to	0	1	5
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	9	to	0	3	0
Diphenylamine	lb.	0	3	6	to	0	3	9
H-Acid	lb.	0	4	9	to	0	5	0
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	6	to	0	2	8
Naphthionate of Soda	lb.	0	2	6	to	0	2	8
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Nevill Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	7	to	0	2	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	10	to	0	0	11
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	dull and quiet, c.i.f. 1/8½ spot	0	1	9
Bay		0	12	0
Bergamot	firm	0	13	0
Cajaput		0	3	6
Camphor, white	per cwt.	4	0	0
Brown	„	3	15	0
Cassia	c.i.f. 10/6 spot	0	11	6
Cedarwood		0	1	4½
Citronella (Ceylon), almost unobtainable on spot, c.i.f. 3/5 spot		0	3	11
(Java)	easier, 3/10 spot	0	4	0
Clove		0	7	6
Eucalyptus	firm and scarce	0	2	6
Geranium Bourbon	firm	1	10	0
Lavender	firm	0	19	0
Lavender spike		0	2	9
Lemon		0	2	11
Lemongrass	per oz.	0	0	2½
Lime (distilled)		0	4	0
Orange sweet (Sicilian)		0	11	0
(West Indian)		0	9	0
Palmarosa		1	3	0
Peppermint (American)		0	15	6
Mint (dementholised Japanese)	easier	0	12	0
Patchouli		1	10	0
Otto of Rose	per oz.	1	15	0
Rosemary		0	1	7
Sandalwood		1	6	0
Sassafras		0	6	6
Thyme	2/6 to	0	8	0

Synthetics.				
Benzyl acetate		0	3	0
Benzoate		0	3	0
Citral		0	10	0
Coumarine		0	18	6
Heliotropine		0	8	0
Ionone		1	5	0
Linalyl acetate		1	2	6
Methyl salicylate	firm	0	2	6
Musk xylol		0	11	0
Terpeniol		0	3	0

Nobel Industries, Ltd.

THE fourth ordinary general meeting of Nobel Industries, Ltd., was held on Friday, September 21, in the Great Hall, at Winchester House, Old Broad Street, E.C.

Sir Harry McGowan (chairman and managing director) presided, and in the course of his speech said that the country during the year under review was freer from industrial disputes than 1921, with the result that their factories were kept well occupied, and with the gradual improvement in trade they found a ready sale for most of their products, the quality of which had not only been maintained, but also improved in every direction.

Reduced Prices of Explosives

"Our primary industry," he continued, "is explosives of all kinds, detonators, fuses, etc., for mining purposes. During the year great advances have been made in that section, and, largely by reason of the improved efficiency which has followed our concentration policy, I am happy to state that we have again been able during the year to make further reductions in the selling prices of these commodities. Our export trade shows encouraging improvement, and when the world gets going again, and the demand for base metals is increased, your company cannot fail to benefit through the explosives requirements. Our shareholders will be interested to learn that the company's trade in blasting explosives in South Africa has shown distinct improvement during the past year."

He had mentioned at the last meeting that, in conjunction with American explosives manufacturers, they had decided to erect a factory in Chile. That factory was now operating, and would be in full working order by the end of the present year. They had excellent reports of the quality of the products, and the officials deserved to be congratulated on getting their factory going in almost record time.

Profitable Factory in Zcecho-Slovakia

With the Continent disturbed as it is they could not expect great things from their investments in explosives factories in the various European markets in which they were interested, but their factory in Czecho-Slovakia is now manufacturing and working at a profit, and it was anticipated that the factories in which they were interested in Hungary and Roumania would be operating by the end of the present year.

Second in importance was the metal section of the business, which was also much better in 1922 as compared to 1921.

After referring to the satisfactory position of the associated companies—the General Motors Corporation and the Dunlop Rubber Co.—he stated that the position of the British Cellulose and Chemical Co., Ltd., was more favourable than a year ago, he finally referred to the firm's relations with labour, which had remained satisfactory. Finally he stated that the first six months' results of the present year were of a promising character, and in the absence of any great upheaval, political or commercial, he saw no reason to anticipate that the results of the present year would fall short of 1922, and as these were so much better than 1921 it would be a source of gratification to their shareholders.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, September 27, 1923.

BUSINESS during the past week has been quiet and there is nothing of importance to record.

Continental offers still incline to be higher than a week ago and spot parcels consequently a little firmer.

Industrial Chemicals

ACID, ACETIC, GLACIAL.—98/100%, £60 to £65 per ton in casks; 80% pure, £51 to £53 per ton; 80% technical, £47 to £48 per ton, c.i.f. U.K. ports, duty free.

ACID, BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton, carriage paid, U.K. stations, minimum ton lots.

ACID, CARBOLIC (ICE CRYSTALS).—Still on offer at about 1s. 2d. per. lb.

ACID, CITRIC.—Moderate inquiry and price unchanged at 1s. 5¾d. per lb., less 5%.

ACID, FORMIC.—Unchanged at about £51, ex-store, spot delivery.

ACID, HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

NITRIC 80°.—About £23 10s. per ton, ex station, full truck loads.

OXALIC.—In little demand. Price about 6d. per lb., ex store.

SULPHURIC, 144°.—£3 15s. per ton, 168°, £7 per ton, ex works, full truck loads. De-arsenicated quality, 20s. per ton more.

ACID, TARTARIC.— B.P. Crystals. Offered from the Continent at 1s. 0½d. per lb. less 5% c.i.f. U.K. port.

ALUMINA, SULPHATE.—Quoted: 14/15%, £8 10s. per ton; 17/18%, at £7 10s. per ton, c.i.f. U.K. ports.

ALUM, CHROME.—Moderate export inquiry. Quoted, £24 to £27 per ton, according to quality, f.o.b. U.K. port.

ALUM, POTASH (LUMP).—Offered from Continent at about £9 15s. per ton. c.i.f. U.K. ports. Spot lots quoted, £10 15s. per ton, ex store.

AMMONIA, ANHYDROUS.—Offered at 1s. 4½d. per lb., f.o.b., U.K. ports.

AMMONIA, CARBONATE.—Lump, 4d. per lb.; ground, 4¼d. per lb., delivered.

AMMONIA LIQUID, 880°.—Quoted, 3½d. per lb., ex station.

AMMONIA, MURIATE.—Grey galvanisers quality, unchanged at £31 to £32 per ton. Fine white crystals offered at £23 15s. per ton, c.i.f., U.K. ports.

AMMONIA, SULPHATE.—25¼%, £12 17s. per ton; 25¾%, neutral quality, £14 per ton, ex works, September delivery.

ARSENIC, WHITE POWDERED.—In little demand. Spot lots now offered at about £69 per ton, ex wharf.

BARIUM CHLORIDE, 98/100%.—Offered from Continent at about £14 10s. per ton, c.i.f., U.K. ports; spot lots about £15 per ton, ex store.

BARYTES.—Finest white English, £5 5s. per ton, ex works.

BLEACHING POWDER.—Spot lots, £11 5s. per ton, ex station. Contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations. Minimum ton lots.

CALCIUM CHLORIDE.—English material, £5 12s. 6d. per ton, ex station. Continental offers at £4 15s. per ton, c.i.f., U.K. ports.

COPPERAS, GREEN.—About £2 2s. 6d. per ton, f.o.b., U.K. port.

FORMALDEHYDE, 40%.—Offered from the continent at £62 10s. per ton, c.i.f., U.K. ports.

GLAUBER SALTS.—Fine white crystals now quoted £3 17s. 6d. per ton, ex store.

LEAD, RED.—English material, £40 per ton, carriage paid U.K. stations. Continental about £36 per ton, ex store, spot delivery.

LEAD, ACETATE.—White crystals. spot lots about £41 per ton, ex wharf. Offered from continent at about £38 5s. per ton, c.i.f., U.K. ports.

MAGNESITE, GROUND CALCINED.—English material unchanged at about £8 to £8 5s. per ton, ex station. Finest Continental about £7 10s. per ton, c.i.f., U.K. ports.

MAGNESIUM CHLORIDE.—Now quoted £2 10s. per ton, c.i.f., U.K. ports. Spot material about £3 2s. 6d. per ton, ex store.

MAGNESIUM SULPHATE (Epsom Salts).—Commercial quality £7 per ton, B.P. quality, £8 5s. per ton, ex station.

POTASH, CAUSTIC, 88/92%.—Spot material now offered at about £32 to £33 per ton, ex store. Continental quotations of about £28 15s. per ton, c.i.f., U.K. ports.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb., delivered.

POTASSIUM CARBONATE.—Spot lots offered at £29 10s. per ton, ex store. Offered from Continent at about £27 per ton, c.i.f., U.K. ports.

POTASSIUM CHLORATE.—Unchanged at about 3d. per lb.

POTASSIUM PERMANGANATE.—B.P. crystals, quoted 10d. per lb., ex store, spot delivery. Lower prices for forward delivery.

POTASSIUM PRUSSIATE (YELLOW).—Unchanged at 1s. per lb., ex store, spot delivery. Very little inquiry.

SODA, CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99%, powdered, £22 15s. per ton. All ex station, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Unchanged at about £25 per ton, ex store, spot delivery. Offered from Continent at about 30s. per ton less, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4½d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; alkali, 58%, now £8 14s. 9d. per ton, ex quay.

SODIUM HYPOSULPHITE.—Continental quotations inclined to be higher at about £9 per ton, c.i.f. U.K. ports. Spot lots quoted £10 5s. per ton, ex store. Pea crystals now offered at about £14 5s. per ton, ex store, spot delivery.

SODIUM NITRATE.—Refined 96/98%, unchanged at about £13 7s. 6d. per ton, f.o.r. or f.o.b. U.K. port.

SODIUM NITRATE 100%.—About £26 to £28 10s. per ton, according to quantity. Moderate export inquiry.

SODIUM PRUSSIATE (YELLOW).—Unchanged at 6d. per lb., ex store, in little demand.

SODIUM SULPHATE (SALTCAKE).—Price £4 per ton, ex station for home consumption. Higher prices for export, with fair inquiry.

SODIUM SULPHIDE.—Continental quotations of about £13 10s. per ton, c.i.f. U.K. ports. Spot lots about £14 15s. per ton, ex store.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

TIN, CRYSTALS.—Unchanged at 1s. 4d. per lb.

ZINC SULPHATE.—Continental material now quoted about £13 10s. per ton, c.i.f. U.K. ports. Spot lots about £14 5s. per ton ex store.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

AMIDO G. SALT.—Small home inquiry. Price 5s. 6d. lb. 100% basis.

ALPHA NAPHTHYLAMINE.—Small export inquiries. Price 1s. 6½d. lb., f.o.b.

DI NITRO TOLUOL.—Home inquiry. Price 1s. 3d. lb., delivered.

DIPHENYLAMINE.—Export inquiries. Price 3s. 3d. lb., f.o.b.

G SALT.—Export and home inquiries. Price quoted 3s. 10d. lb. 100% basis.

H ACID.—In good demand. Price 4s. 10d. lb. 100% basis.

GAMMA ACID.—Good export demand. Price quoted 12s. 11d. lb. 100% basis, f.o.b.

META PHENYLENE DIAMINE.—Considerable export inquiries. Price quoted 5s. lb., f.o.b.

META TOLULENE DIAMINE.—Some export inquiries. Price quoted 5s. 2d. lb., f.o.b

NITRO NAPHTHALENE REFINED.—Moderate demand. Price 1s. per lb., delivered.

NITRO TOLUOL.—Home inquiry. Price 8¾d. per lb., delivered.
NEVILLE WINTHER ACID.—Some export inquiries. Price quoted 5s. 11d. lb. 100% basis, f.o.b.
PARA NITRO ORTHO TOLUIDINE.—Foreign demand. Price quoted 6s. lb., f.o.b.
R SALT.—Export and home inquiries. Price 3s. lb. 100% basis, f.o.b. or delivered.
SULPHANILIC ACID.—Home and export inquiries. Price 1s. 1d. lb. 100% basis, delivered or f.o.b.
TOLIDINE BASE.—Export inquiry. Price quoted 7s. lb. 100% basis.

Sir S. W. Royse's Monthly Report

THOUGH there has been some improvement in business during September as compared with the two preceding months, the demand from the home trade is still on the quiet side, and consumers continue their hand-to-mouth policy. The export inquiry is rather better, but continental conditions still militate against any considerable increase in trade. Prices on the whole shew very little alteration. There has been a better home demand for sulphate of copper and some concessions have been made in price, but inquiry for export has been nominal. Green copperas has been selling well but stocks continue large. Acetates of lime have been moving only slowly and are in better supply. Acetic acid also is offered more freely, but acetate of soda is rather scarce and stocks are firmly held. Acetates of lead have been in good demand and prices are higher, especially for brown. Nitrate of lead has been selling well for both home and export account. Carbonate of potash has been in improved demand but there are good stocks on this side resulting in little variation in price. Caustic potash has been quiet and values are rather lower. Montreal potashes have been little called for. Business in yellow prussiates has been only moderate; potash is freely offered at lower rates, but soda is firmer with the clearance of second-hand parcels. White powdered arsenic has been moving only in small lots and the export demand has not developed. The keen competition in tartaric acid and cream of tartar continues, and, with a lessened demand, values have weakened. Citric acid also is lower. Bichromates are unchanged, but chlorates have been meeting with a better enquiry whilst nitrate of soda is realising full figures. Borax and boracic acid have been reduced £2 per ton, but the demand, has been chiefly for the high grade qualities and for the home trade. Oxalic acid is rather better owing to less offering from abroad, but trade is confined to small lots. There is no change to report in alum and sulphate of alumina which are still pressed for sale from the continent. Bleaching powder, white caustic soda and alkali products generally have been in somewhat better demand both for home and export. The market for tar products remains practically unchanged. Benzols and toluols have been in only moderate demand, but the further reduction in petrol should have the effect of stimulating business. Solvent naphtha remains quiet; the small orders passing are keenly competed for and lower prices have been taken. Creosote continues steady with supplies scarce and fair quantities are being exported. Crude carbolic acid remains firm with little offering. If anything, naphthalenes have a better tone, but little is being done in the refined product, the inquiry being principally for crude. In pitch, market conditions are still difficult and business has been consequently limited. Lower values have been accepted both for export and South Wales. There is nothing to report in sulphate of ammonia.

German Export Licences Suspended

IN view of the general increase in the cost of production in Germany and the partial stoppage of German exports, the Government has decided to end the system of export licences as from September 27, except for foodstuffs and a number of classes of raw material and semi-manufactures. The exporter will still be required to surrender 30 per cent. of the foreign bills received. Export will then be facilitated, but the control of export prices will no longer be in the hands of the manufacturers, and traders will be able to export below factory prices. If the depression lasts this is likely to be done extensively. The measure is an emergency one only, and there is no reason to suppose that the Government will continue it once export possibilities improve again.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, September 27, 1923.

RATHER conflicting reports are in circulation as to the condition of things in the cotton industry; one of the principal outlets for heavy chemicals. A statement this week is to the effect that business in cotton goods is a good deal more active than is generally believed. Whether this is so or not, the improved tone of the chemical market has kept up, both on home and foreign account, although, as pointed out last week, buying is by no means on the scale which chemical traders here regard as normal.

Heavy Chemicals

Prussiate of soda is still one of the weak spots, demand remaining quiet with, however, prices fairly steady at round 6d. per lb. Hyposulphite of soda is also inactive; photographic crystals are still quoted at £14 to £14 10s. and commercial at £9 10s. per ton. Saltcake is being shipped in fair quantities to overseas markets; home trade prices are steady at £4 10s. per ton, though the demand in this section has not improved. Caustic soda is firm and in steady demand at from £16 17s. 6d. per ton for 60 per cent. to £19 7s. 6d. for 76–77 per cent. material. Glauber salts are quiet, but price is maintained at round £4 per ton. Bleaching powder is firm at £11 5s. per ton to home users, who, as well as foreign buyers, are taking fairly satisfactory quantities. Soda crystals are unchanged at £5 5s. per ton delivered, with business still only on moderate lines. Sulphide of soda keeps quiet at £14 10s. per ton for 60–65 per cent. concentrated solid and £9 per ton for crystals. Bicarbonate of soda is in steady inquiry at £10 10s. per ton delivered. Alkali is in fair demand for home consumption at £7 12s. 6d. per ton for 58 per cent. material; buying on export account is also active. Nitrite of soda is scarce and firm at £26 10s. per ton. Chlorate of soda is in steady request, with prices well maintained at 2¾d. per lb. Acetate of soda keeps scarce for early delivery at £24 per ton. Bichromate of soda is in fairly active demand at 4½d. per lb. Phosphate of soda is about unchanged at £15 per ton, but not much business is being put through.

The demand for both caustic potash and carbonate keeps up and prices are steady; caustic, 89–90 per cent. material, is offered at £29 to £30 per ton, and carbonate from £28 for 90–92 per cent. quality to round £30 per ton for 96–98 per cent. Yellow prussiate of potash is still on the easy side at 1s. to 1s. 1d. per lb., little improvement in the demand being reported. Permanganate of potash is also rather quiet at about 9½d. per lb. Chlorate of potash keeps firm at 3d. per lb., with a fair amount of buying interest being shown. The demand for bichromate of potash keeps up, and prices are steady at 5¾d. per lb.

Sulphate of copper commands little attention from either home or foreign buyers, the prices continue at last week's range of £25 10s. to £26 per ton, f.o.b. Arsenic is easier at £68 to £70 per ton for white powdered, Cornish makes, offers of foreign material being at lower figures. Commercial Epsom salts are in moderate inquiry at £4 10s. per ton; magnesium sulphate, B.P., is offered at £6 to £6 10s. Nitrate of lead is rather inactive at round £42 per ton. Sugar of lead is in short supply; white is firmly held for £40 to £42, and brown at £42 to £43 per ton. Acetate of lime is likewise very steady at £21 to £22 for grey and £12 per ton for brown.

Acids and Tar Products

Both tartaric and citric acids are quiet though prices are steady at 1s. 1¼d. to 1s. 2d. and 1s. 6d. to 1s. 7d. per lb. respectively. Oxalic acid continues inactive at 5¾d. to 6d. per lb. Acetic acid is maintained at £47 for 80 per cent. technical and £65 per ton for glacial, a quietly steady demand being met with.

The pitch market is in an uncertain condition, little actual business being done though inquiries are numerous; prices are nominally between £6 and £7 per ton, Manchester. Creosote oil is in fair demand at 8½d. per gallon. Solvent naphtha is steady at 1s. 3½d. to 1s. 4d. per gallon, but business is quiet. Supplies of carbolic acid are not excessive and prices are firm at 3s. 6d. per gallon for crude and 1s. 2½d. per lb. for crystals. Nothing much is being done in naphthalines at the moment; refined is on offer at £19 to £20 per ton and crude £6 to £13.

Company News

AMERICAN CYANAMID CO.—Dividends at the rate of 1½ per cent. on the preferred stock and 1 per cent. on the common stock are payable on October 1.

BRITISH COTTON-SEED PRODUCTS CO., LTD.—The accounts for the year to March 31 last show a loss of £3,935, increasing the debit balance carried forward to £10,105.

ENGLISH CHINA CLAYS, LTD.—The directors announce a interim dividend at the rate of 4 per cent. per annum, less tax, on the ordinary shares for the past half-year, payable on October 3.

ENGLISH MARGARINE WORKS (1919).—The directors, after consideration of the accounts for the six months ending June 30, 1923, regret that they are unable to declare a dividend on the preference shares.

PILBARA COPPER FIELDS, LTD.—The accounts for the two years ended June 30, 1922, show, after paying 1st mortgage debenture interest, a loss of £5,043, which increases the total debit balance to £10,792. The balance of expenditure on the mine, after deducting proceeds of ore realised (£10,263), has been transferred from mine working account to development account. It is stated that, in accordance with an agreement with the 2nd mortgage debenture holders, no interest accrues until July 1, 1925. An experimental plant is being erected in connection with the adoption of the treatment process controlled by Minerals Separation, Ltd.

BRITISH GLUES AND CHEMICALS, LTD.—The accounts for the year ended May 31 last show that the balance of profit, after allowing £31,814 for depreciation and £22,041 for taxation, was £13,773, to which is added £64,696 brought forward, making £78,469. This sum it is proposed to carry forward, subject to balance of taxation liability. The report states that, notwithstanding unceasing efforts to come to agreement with the Inland Revenue Authorities, it has not yet been possible to ascertain the company's liability for taxation. In the preceding year there was a net loss of £64,177. A dividend for the half-year ended September 30, 1921, on the 8% cumulative preference shares has been paid, and this leaves the shares in arrears of dividend as from October 1, 1921. The ordinary general meeting will be held at the Cannon Street Hotel on October 3, at noon.

AMERICAN CELLULOSE AND CHEMICAL MANUFACTURING CO.—A statement of particulars of the American Cellulose and Chemical Manufacturing Co., published on Thursday "for public inspection only," says that the company, which was constituted on January 5, 1918, has a share capital, issued or to be issued, totalling $6,350,400, and an issued loan capital in the form of Eight per cent. Ten-year Bonds, amounting to £400,000. The works were established during the war at the request of the American Government, which required the company's products in connection with aeroplane manufacture. Compensation amounting to $1,503,404 has been paid by the Government in settlement of the contract cancelled after the Armistice, and this sum has been applied in writing down the cost of the properties. The company owns the sole rights for the United States and its Dependencies, etc., to manufacture cellulose acetate and articles produced therefrom under the Dreyfus patents and processes.

Bankruptcy of Chemical Dealer

THE first meeting of the creditors of Thomas James Shilvock, trading as Shilvock, Son and Co., Globe Chambers, 493, New Cross Road, London, dealer in chemicals, was held on September 21 in London. The statement of affairs showed liabilities of £380, and there were no assets. The debtor attributed his failure to trade depression, falling markets, lack of capital, bad debts and inexperience of merchants' business. It appeared that in September, 1920, with £650 capital borrowed from his father, he commenced trading in his own name at his present address. In June, 1923, Mr. Shilvock sold the business, which had never been successful, to a limited company formed for the purpose, in consideration of the allotment to him of 300 £1 fully paid shares and the discharge of the liabilities. He had since been employed as manager of the company. The matter was left with the Official Receiver as trustee of the estate.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

FERTILISERS.—An agent in Warsaw desires to secure the representation for Poland of British exporters of fertilisers.

"Chemical Age" Inquiry List

The following inquiry has been received from a reader of "The Chemical Age." Replies addressed to the box number given below, c/o "The Chemical Age," 8, Bouverie Street, London, E.C.4, will be forwarded to the inquirer.

A consulting chemical engineer in New York requires the name and address of a company manufacturing Resin by the name of "Perna." No. H.31.

Tariff Changes

BRITISH NORTH BORNEO.—The Customs duty leviable on petrol, benzine, gasoline, and similar volatile oils or spirits imported into British North Borneo has been fixed at the rate of 25 cents per gallon.

MEXICO.—The import duty on unscented soap for washing or scrubbing (Tariff No. 694) has been increased to 0·15 pesos per kilogramme legal.

The Veglene Oil Refinery and Chemical Works, Ltd.

A MEETING of the creditors of the Veglene Oil Refinery and Chemical Works, Ltd., Cardiff (in voluntary liquidation) was held on September 21 at the offices of the liquidator, Mr. S. E. Clutterbuck, I.A., when a statement of affairs was submitted which showed liabilities of £1,228 16s. 8d., of which £968 18s. 1d. was due to unsecured creditors. There were debentures for £2,000, and interest accrued £15, while there was an amount of £33 5s. due to Mr. Fisher. The assets totalled £1,818 5s. 7d., from which had to be deducted £29 19s. 2d. for preferential claims, leaving net assets of £1,788 6s. 5d., which was not sufficient to cover the claim of the debenture holder, and there would, therefore, be nothing available for the unsecured creditors. The issued capital was £2,000, thus showing a deficiency as regarded the shareholders of £3,228 16s. 8d. The assets comprised plant and buildings, £1,782 18s. 2d., estimated to realise £1,000; office furniture, £150 7s., expected to produce £50; plant, £151 4s. 6d., valued at £35; building materials, etc., £28 2s. 1d., estimated to realise £5 10s.; stocks in trade, £215 12s. 8d., expected to produce £115; cash at bank and in hand, £1 11s.; good book debts, £414 16s. 7d.; doubtful and bad debts, £194 17s. 1d., valued at £80; and sundry items, £116 8s.

The company was registered in September, 1921, with a nominal capital of £5,000, divided into 5,000 £1 shares. There were 2,000 shares allotted to the vendors, while £2,000 was found in cash by Mr. Fisher and Mr. Del Guerra, who took two debentures for £1,000 each. In April last year Mr. Del Guerra resigned from the board and Mr. Fisher transferred to him his debentures. In August last Mr. Del Guerra, as sole debenture holder, appointed a receiver, who was now in possession. It appeared that the trading of the company had never been successful and balance sheets prepared showed that for the period from September 24, 1921, to December 31, 1921, there was a loss of £430. For the period from December 31, 1921, to September 30, 1922, the loss was £660, while from October 1, 1922, to August 31, 1923, there was a loss of £409. It was stated that the assets had been written down very considerably in the statement of affairs as it was not anticipated that at a forced sale they would realise any more than the figures at which they were set down.

A resolution was passed confirming the voluntary liquidation of the company, with Mr. S. E. Clutterbuck as liquidator.

Subsequent to the creditors' meeting the committee of inspection met and resolved that the liquidator should approach the receiver for the debenture holder with a view to arranging to offer the business for sale as a going concern, and that, if possible, some arrangement should be made with Mr. Del Guerra to take over the premises in discharge of his debenture and release the remaining assets for the unsecured creditors.

THE BRITISH ALIZARINE COMPANY LTD.

Manchester London Glasgow

Manufacturers of Alizarine Dyestuffs

ALIZARINE RED (all shades)

ALIZARINE BLUES (soluble and insoluble)

ALIZARINE BORDEAUX

ALIZARINE CYANINE

ALIZARINE GREEN (soluble and insoluble)

ALIZARINE ORANGE

ALIZARINE RED S. POWDER

ALIZARINE BLUE BLACK

ALIZARINE (MADDER) LAKES (of all qualities)

ALIZARINE MAROON

ALIZUROL GREEN (Viridine)

ANTHRACENE BROWN

ALIZANTHRENE BLUE

ALIZANTHRENE BROWN

ALIZANTHRENE YELLOW

Other fast colours of this series in course of preparation

Anthraquinone, Silver Salt and all intermediates of this series

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CHROME TANNING and other Chrome Compounds

TELEPHONES
663 Trafford Park, MANCHESTER
560 EAST LONDON
2667 DOUGLAS, GLASGOW

TELEGRAMS
BRITALIZ MANCHESTER
BRITALIZ LONDON
BRITALIZ GLASGOW

All communications should be addressed to

The British Alizarine Co., Ltd.
Trafford Park, Manchester

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BISSELL, Mr. S. S. J. (trading as WOODBROOK DRUG CO.), Back 39, Vale Place, Wolverhampton, manufacturing druggist. (C.C., 29/9/23.) £13 11s. 10d. August 17.

PREMIER COLOUR CO., 106, Leeds Street, Liverpool, paint manufacturers. (C.C., 29/9/23.) £14 5s. July 30.

SURFO SOAP CO., Grant Street, Garnet Street, Bradford, soap manufacturers. (C.C., 29/9/23.) £13 5s. 11d. August 14.

WATSON, Mr. H. J., Welmondin, Goldhawk Road, Hammersmith, polish manufacturer. (C.C., 29/9/23.) £19 15s. 10d. August 23.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BRITISH ISINGLASS CO., LTD., Grimsby. (M., 29/9/23.) Registered September 18, £6,000 debentures; general charge. *£4,000. October 10, 1922.

CATALYTIC CHEMICAL CO., LTD., Southall. (M., 29/9/23.) Registered September 19, £500 debentures (see Note), balance of £1,500; general charge. NOTE.—The company's return states that the statement registered April 6, 1923, showing the issue of £900, was in error. *£9,600. January 13, 1923.

INDESTRUCTIBLE PAINT CO., LTD., London, E.C. (M., 29/9/23.) Registered September 13 (by order on terms), deed of agreement and charge securing certain moneys in respect of sewer rate, to Royal Agricultural Society of England; charged on premises at Willesden. *Nil. April 5, 1923.

SEVEN KINGS LAUNDRY, LTD. (M., 29/9/23.) Registered September 11, charge, to bank; charged on Central Hall, Seven Kings, and adjoining property. *£400. October 30, 1922.

Satisfactions

ROLLS AND CO., LTD., London, N., varnish manufacturers. (M.S., 29/9/23.) Satisfaction registered September 17, £600, part of amount registered October 13, 1902.

London Gazette

Company Winding Up

OIL PROCESSES, LTD. (Canada), 8, Waterloo Place, London. (C.W.U., 29/9/23.) Last day for receiving proofs for intended dividend, October 8. H. E. Burgess, Senior Official Receiver and Liquidator, 33, Carey Street, Lincoln's Inn, London, W.C.2.

Partnership Dissolved

BROOKE AND FARRAND (Joseph Aspinall Linton BROOKE and James Blackburn FARRAND), chemical manufacturers and merchants, Amisfield House, Hipperholme, in the county of York, as from September 11, 1923, by mutual consent. Debts received or paid by J. A. L. Brooke.

Companies Winding Up Voluntarily

NEWCASTLE GRAPHITE CO., LTD. (C.W.U.V., 29/9/23.) H. Boag, Milburn House, Newcastle-upon-Tyne, appointed liquidator. Meeting of creditors Milburn House, Newcastle-upon-Tyne, on Friday, October 5, at 3 p.m.

PARK GREEN DYE WORKS, LTD. (C.W.U.V., 29/9/23.) J. A. Snape, 5, John Dalton Street, Manchester, chartered accountant, appointed liquidator.

SHAKA SALT CO., LTD. (C.W.U.V., 29/9/23.) E. O. Mosley, 16, Bolton Street, Bury, Lancashire, chartered accountant, appointed liquidator.

WESTERN CHEMICAL CO., LTD. (C.W.U.V., 29/9/23.) W. Moore, A.C.I.S., 9, Clifford Street, New Bond Street, W.1, appointed liquidator. Meeting of creditors at 9, Clifford Street, W.1, on Friday, October 5, at 11.30 a.m.

Bankruptcy Information

FENTON, Harry, lately residing and carrying on business as a laundry proprietor, at 83, Cleveland Road, Surbiton. (R.O., 29/9/23.) Receiving order, September 22. Debtor's petition.

Notices of Intended Dividends

WILKINSON, Emmanuel, Kitty Lane, Marton Moss, St. Annes-on-Sea, laundry proprietor, lately carrying on business at Owen Street, Accrington, in the county of Lancaster. Last day for receiving proofs, October 11. Trustee, A. F. Fynney, Empress Buildings, 91, Church Street, Blackpool.

WILKINSON, William, "Myrtle Dene," Queen's Road, Accrington, laundry proprietor, and lately carrying on business at Owen Street, Accrington. Last day for receiving proofs, October 11. Trustee, A. F. Fynney, Empress Buildings, 91, Church Street, Blackpool.

New Companies Registered

NORTHERN SABULITE EXPLOSIVES CO., LTD., 129, Victoria Road, Darlington. Manufacturers of explosives, gunpowder, nitroglycerine, dynamite, etc. Nominal capital, £50,000 in £1 shares.

IDEAL REQUISITES (1923), LTD., 22, Victoria Chambers, South Parade, Leeds. Manufacturers of disinfectants, soaps, polishes, foodstuffs, etc. Nominal capital, £500 in £1 shares.

ALFRED FAIRCLOUGH, LTD., Daisy Works, Daisy Walk, Sheffield. Dealers in bones, animal products, hides, fats and the like; glue, gelatine and fertiliser manufacturers and merchants, bone crushers, grease manufacturers, etc. Nominal capital, £1,000 in £1 shares.

ASHWOOD DALE QUARRIES, LTD., near Buxton, Derbyshire. Producers of lime, limestone for chemical purposes, dolomite and other basic materials, tar, tar macadam, etc. Nominal capital, £10,000 in £1 shares.

DY-O-LA DYE CO., incorporated in New Hampshire, U.S.A., to manufacture and market dyes, dyestuffs, colouring matter, drugs, chemicals, etc. The capital is of two kinds, viz., with nominal or par value, 375,000 dollars in 100 dollar shares, and without nominal or par value, 50,000 shares in 25,000 shares of common class "A" and 25,000 shares of common class "B." The British address is 95, St. James' Street, Manchester.

SWALCLIFFE LIMESTONE FERTILISER CO., LTD., Swalcliffe, near Banbury. To acquire the business of quarrying and crushing limestone for use as a fertiliser. Nominal capital, £5,000 in £1 shares.

Hydrocyanic Acid as a Fumigant

BECAUSE hydrocyanic acid, in the gaseous form, is used extensively in the United States as a fumigant for the destruction of insects and rodents, it often comes in contact with fruits, vegetables, and other foods, and thus may be absorbed in sufficient quantity to be dangerous to man. In recent investigations the Bureau of Chemistry of the United States Department of Agriculture has determined the quantity of the fumigant, which is absorbed and retained by various foodstuffs, all products examined being found to absorb the acid to some extent. Results of the investigations are given in Department Bulletin 1,149.